amateur radio

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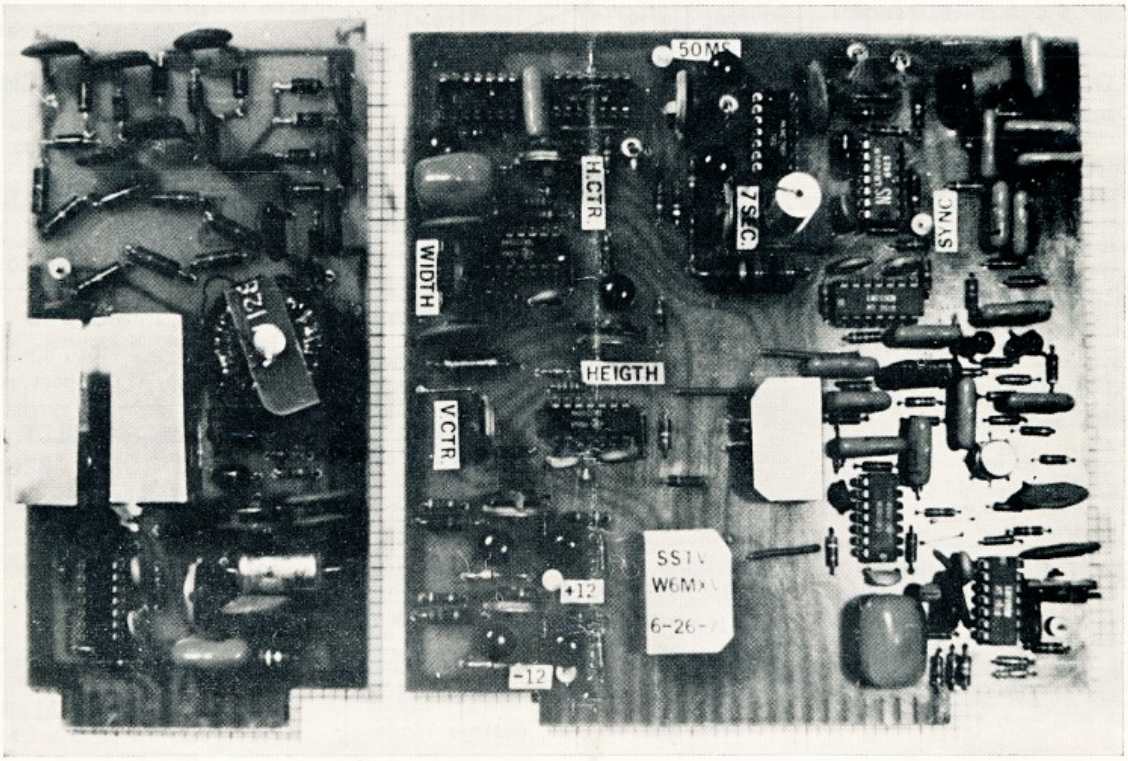

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amateur radio

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★

ACKNOWLEDGMENTS: If you write to Federal Executive or to the Manager no acknowledgment is sent out unless you specially request one. Better still, for important items, send them certified mail.

★

Members of the W.I.A. should refer all enquiries regarding delivery of "A.R." direct to their Divisional Secretary and not to "A.R." direct. Two months' notice is required before a change of mailing address can be effected. Readers should note that any change in the address of their transmitting station must, by P.M.G. regulation, be notified to the P.M.G. in the State of residence; in addition, "A.R." should also be notified. A convenient form is provided in the "Call Book".

CONTENTS

COVER STORY

Pictured on our front cover is a PC board of a typical Slow-Scan TV Monitor complete less CRT and EHT supply. Note ICs are used throughout. See S.S.T.V. article on page 3.

FEDERAL COMMENT:

NEW LOOK IN ADMINISTRATION: E.D.P.

This New Year marks yet another step forward in Institute affairs. During last year, as decided at the 1971 Convention in Brisbane, the entire membership details were programmed into computer files to serve three primary and numerous secondary functions.

The three primary objectives are:—

Preparation of subscription notices;

Constantly updated mailing lists for "A.R.";

Australian Call Book printing data.

The first of these has been achieved as all members should already have received their notices for subscriptions due for the year 1972. The second is imminently in operation and the third is partly a function of the material now held being merely the "pressing of a button" to obtain within minutes a print out of the necessary details after feeding in the missing data.

It is equally important, as a corollary, to observe that the data now on file can only be amended or added to BY EACH DIVISION in respect of the members of that Division. Carefully conceived security checks have been devised to ensure that this continues. It is also necessary to assure members that whatever levies are deducted for Federal activities can only be done by the agreement of Divisions and then only at a Federal Convention under normal conditions.

I am glad at this stage to acknowledge the enormous debt of gratitude owed by the Institute to Dr. Deane Blackman, VK3TX, for conceiving and organising the entire project. Without his help, which has also given us considerable savings compared with commercial operations, the old muddles would have continued in certain areas of application.

To programme the details of the membership has required a number of compromises to comply with the objectives on the one hand and the inherent limitations on the other. For some Divisions the detail appears too great, to others too restricted. In certain areas the programme does not admit of infinite variation.

With these points in mind the existing financial arrangements had to be fitted into the system. VK2, VK4 and VK5 Divisions operate a subscription year running from March in one year to February of the next year. VK7 Division is in process now of changing over to the calendar year. VK3 and VK6 are already on a calendar year basis (January to December). Subscription rates in VK2 and VK6 were recently increased and certain revisions were carried out in another Division.

In the Federal field, the I.A.R.U. dues were on a calendar year basis but the per capita fee was still on the March-February year. "Amateur Radio" itself, by agreement at the last Convention, is scheduled for early transfer to Federal Executive from the VK3 Division. At the last Convention the annual Federal per capita fee from 1/1/72 was increased from 55c per member to $3.35 for each Full and Associate grade of member to pay for the administration costs of the Federal office.

Resulting from all these variants, it was necessary to programme the computer with amounts equivalent to ten-twelfths of the annual subscription rates for each of the Divisions on a March-February year, full subscription rates on the others; a full year of the per capita fees less two-twelfths of the amount already paid and ten-twelfths of the costs of "A.R."

This was by prior agreement with the Divisions and results in all the Institute subscriptions, fees, dues and levies for the 1972 year concluding on 31st December, 1972. Most of the Divisions, as a matter of practical application, have ended their financial year on this date and it is, therefore, convenient that all the financial arrangements now fit the calendar year.

As a result of these considerations the members of some Divisions will have noticed that their subscription rates appeared peculiar (being 10/12ths of the annual rate) and others will have observed unusual rates of Federal deductions (again 10/12ths in most instances). Due to various teething troubles and because we could not afford to run two systems in parallel, two errors crept into the programme which resulted in an erroneous grand total on each notice and description errors in the sub-divisions of fees. Both had to be corrected by hand unfortunately.

In the past, subscriptions have been paid to Divisional offices. From these amounts have derived the Federal contributions paid over to Federal Executive in lump sums by each Division. In the new system all subscriptions are required to be sent direct to Federal Executive where they will be accounted for with Divisions at frequent intervals and through the computer to tally-in with the previously programmed data. Although the accounting load on the Federal office will be considerably enhanced, it is hoped that a modern accounting system will readily cope with the demands made on it. Delays along the line will occur when members make or send payments to their Divisions. Receipts will not be issued unless specially requested by the sender so it will be desirable whenever possible to pay by crossed cheque made out to "W.I.A." or "Wireless Institute".

What else does all this mean? The centralisation of subscriptions and the processing through E.D.P. of address changes and other alterations will relieve Divisions of a tremendous volume of work normally done by hard working volunteers. Several Divisions have commented that the preparation of the E.D.P. material has unveiled hitherto unsuspected areas of confusion and error.

Even now, errors may occur either by reason of inevitable and unavoidable communications delays or through normal human inaccuracies. Although the computer is deemed to be exact in its work, data has to be transcribed for the input and the nature of the data must comply with fixed specifications in the programme. Mistakes do occur in both these areas, but the percentage error is low. All these mistakes have to be found and have to be corrected. Sometimes yet another error arises whilst correcting a mistake. One example met with was changing a member's initials which had originally been incorrectly inserted. The correction brought out the correct initials, but in the process the member's name and title were erased. These had to be resurrected but in this process the member's serial number was incorrect with the result that the whole of the member's details had to be re-submitted and we began again at square one. Fortunately, such examples are very, very few in number but are time-consuming to rectify.

The whole of this operation is a collective effort in co-operation by a great many people so, if you do find an error in your subscription notice, please tell, or write to, the Federal Manager about it. Every possible precaution has been taken to ensure correctness and completeness, but in any new undertaking various difficulties always seem to arise despite the best endeavours to avoid them.

Two concluding thoughts. One is to wish you and yours all you wish yourself in the year ahead, and the second is to ask your continued support for the Institute and the Amateur Cause in every possible way.

—MICHAEL J. OWEN, VK3KI,
Federal President, W.I.A.

SLOW-SCAN TELEVISION—THE AUSTRALIAN WAY

J. A. WILSON, VK3LM'T, and A. H. McKIBBIN,† VK3YEO*

Have you ever wanted to respond to the call "CQ Slow-Scan, CQ Slow-Scan, W6 – – – calling"? Or have you ever heard a variety of audio tones being transmitted on h.f. and wonder what is going on? It could be a CQ call being transmitted in video form but, alas, you can't answer it. Do you want to know more? Then please read on.

SLOW-SCAN TELEVISION (s.s.t.v.) presents an intrigue that is rapidly growing in popularity within the Amateur fraternity. While maintaining all of the DX potential available to conventional s.s.b. transmission, it adds the facility of instantly transmitting picture information in the equivalent audio bandwidth used for voice transmission. Additionally, the pictures may be tape-recorded on a conventional audio tape-recorder and played back any time.

The delightful feeling on first becoming acquainted with the h.f. communications seems to repeat itself with the potential of slow-scan where both activity and DX contacts are a reality.

One of the first items needed to begin in this field is a slow-scan monitor, about which more information will be presented later.

S.s.t.v. earns its name from a scanning rate that is much slower than conventional t.v. In order to use a conventional t.v. camera for s.s.t.v., the horizontal and vertical sweep circuits would have to be modified for the slower sweep frequencies. Another method by which s.s.t.v. pictures can be produced is by means of a flying-spot scanner. Here you cannot transmit live action, but must rely on a slide, negative or photograph which is scanned by a dot of light being produced by a fast-moving electron beam of a c.r.t. focused on to the slide, negative or picture. The light, either passing through the slide or alternatively being reflected from the photograph, modulates a photo-multiplier tube. This video information is combined with vertical and horizontal sync. signals which modulate a conventional Amateur transmitter via the microphone input.

S.S.T.V. SYSTEM USED TODAY

An s.s.t.v. signal is a 1.5 kHz. tone which is shifted down to 1.2 kHz. for sync. information, and modulated upwards to 2.3 kHz. for picture information (video information). The 1.5 kHz. represents the black level and 2.3 kHz. is the white, with tones in between giving shades of grey. The 1.5-2.5 kHz. shift is similar to facsimile and possibly receiving converters could be used on either mode.

A 5-m.s. burst of 1.2 kHz. tone gives the horizontal sync. pulse, while a 30-m.s. pulse of 1.2 kHz. is used for the vertical sync. (see Fig. 2). A horizontal sweep rate of 15 Hz. and a vertical sweep rate of either 7.2 seconds or 8 seconds results in a horizontal resolution of 120 lines. It should be noted by the way that none of these standards is critical.

Although the idea of s.s.t.v. was widely circulated in the late 1950s, the first serious Amateur experiments took place in 1967 when a group of Stateside Amateurs was given permission by the F.C.C. to explore the feasibility of s.s.t.v. on 10 metres. The experiments were a success, and in August 1968, the F.C.C. announced frequency allocations for U.S. Amateurs.

In Australia, we are permitted to transmit s.s.t.v. on any authorised Amateur band provided the bandwidth does not exceed that of an a.m. station, e.g. 6 kHz.

Photo of Jim K1MEA/4 taken from monitor of VK3YEO. Signal strength less than S1. Noise and fading seen on the picture, also lack of horiz. sync. Recorded on Bigsten Cassette Recorder C120 at 1⅞/sec. Receiver FT200, tri-band beam TH3Jr., 40 ft. at VK3BFT (C.T.C. club station), operator was John VK3LM.

Many users of the v.h.f. nets in Melbourne may have heard the woeful tones of s.s.t.v. being transmitted over either 52.525 MHz. f.m. net or Channel B 2 metre f.m. net from time to time and have wondered just what is going on.

Since an f.m. type signal is used for sending the information, the receiving monitors can have a good deal of limiting built in, thus making the system relatively immune to interference from voice signals in adjacent channels.

One of the major benefits of any f.m. system is the "**capture**" effect, which permits the dominant signal to come through easily but reduces or eliminates the effect of the others.

During early experiments, a.m. was used and it was found that by this method, the pictures were greatly degraded after passing over long distances by noise, fading and adjacent-channel interference.

STANDARDISATION

The standardisation question has two sides to it. On the one hand, the man who is thinking of building equipment desires a measure of assurance that his equipment will not be obsolete as soon as it is built. On the other hand, in the long-range picture, it would be a shame to settle for less than the best possible system—the

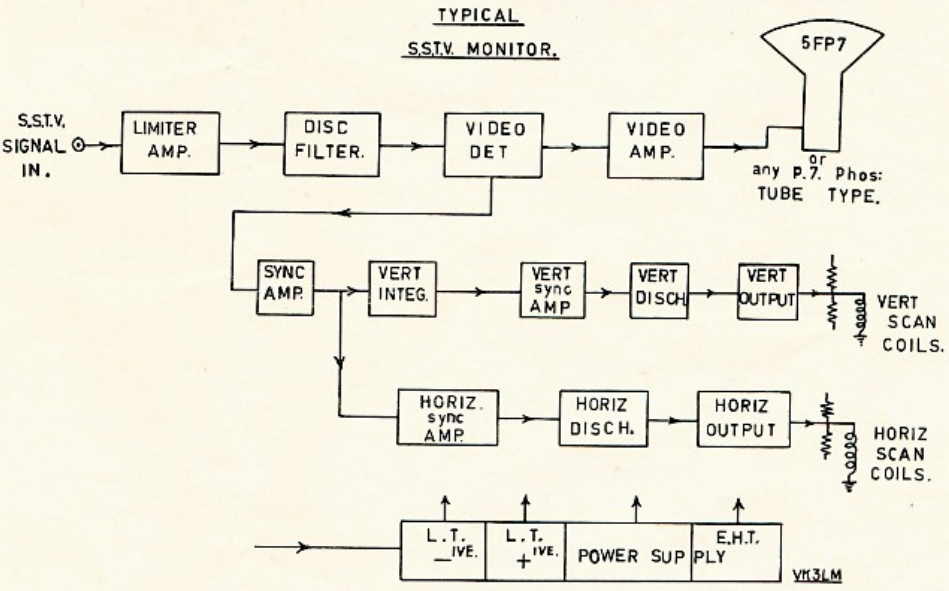

FIG. 1.

* 14 Merrilong Street, Ringwood East, Vic., 3135.
† 27 Beverley Street, East Doncaster, Vic., 3109.

"best" in this case being the optimum compromise between many factors. The system at the moment follows the following guide-lines:—

1. It utilises existing transmitting and receiving apparatus in the Amateur station and this equipment requires no modification at all (e.g. a.m., s.s.b. or f.m. modes).

2. The system can use simple equipment involving moderate cost and readily available components.

3. The system performance is good using simple equipment and by using more sophisticated equipment, it is possible to obtain extremely good results under very poor conditions.

4. The system must be compatible with both 50 and 60 Hz. power frequencies to permit world-wide operation as American circuits are designed to lock to the 60 Hz. mains supply.

Perhaps we in Australia could improve on s.s.t.v. standards as the Federal Executive has stated that they are willing to accept recommendations to suit Australian and overseas standards.

For example, here in Australia 50 Hz. mains supplies are evident. We could utilise this for the Australian system and increase the horizontal resolution to say 150 lines per frame or even more. Therefore our monitors would be capable of both 50 and 60 Hz. systems. What are your views on this?

At the present time, it is known that about 500 Amateurs throughout U.S.A., England, Sweden, New Zealand and Australia are active on s.s.t.v.

In Australia, Eric VK6ES is probably the pioneer of s.s.t.v. and has been active for several years. The following is a list of known Amateurs who, at the time of printing, are either active or are in the process of building s.s.t.v. gear:

W.A.—Eric VK6ES

S.A.— Max VK5MF

Vic.— John VK3LM/T, Ringwood E.
George VK3NU, Burwood
Stan VK3TE, Elwood
Wally VK3ABM, Toorak
Kevin VK3ARD, Mt. Waverley
Neville VK3YDR, Rosanna
Mac VK3YEO, Doncaster East

Other States—activity not known.

TRANSMISSIONS

Transmissions take place mainly on 14.230 MHz. in the 20 metre band, ±8 kHz. should the channel be already in use.

In VK3, the co-authors (Mac VK-3YEO and John VK3LM/T) have been handling pictures on 52.525 MHz. 6 metre f.m. and occasionally on Channel B 2 metre f.m. At a later stage, we would like to estabilsh a v.h.f. slow-scanners frequency where experiments and video traffic could be transmitted without interference to other station modes.

With s.s.t.v., we transmit individual pictures rather than movies as in conventional t.v. A long persistance c.r. tube with a P7 phosphor is used so that the image will remain long enough on the screen during the scanning period of the information. Pictures can then be photographed with either conventional or "polaroid" cameras. QSL cards could be made showing the actual picture received from the transmitting station. Alternatively, audio tape QSLs could be exchanged.

Pictures can be received and recorded on standard ¼" audio tape on a reasonably good quality tape recorder at a speed of 3¾" per second. Alternatively, a good quality "Philips-type cassette" recorder at 1⅞" per second can be used. The basic requirement of the recorder is to have a low wow and flutter rate, otherwise the pictures will have wavy edges due to recorder speed variation similar to horizontal "pulling" seen on some commercial fast-scan t.v. receivers. Good success has been had recording pictures on a cassette recorder.

Fig. 4.—Picture taken from a commercial monitor of U.S. origin and readers should observe the pin-cushion effect that occurs on most 25-inch tubes today.

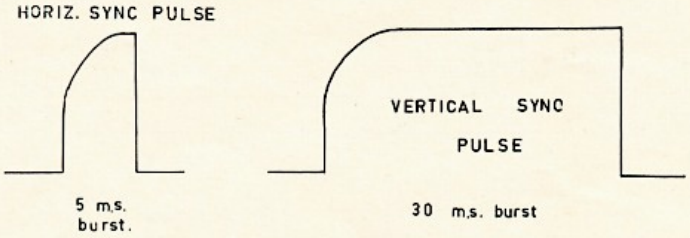

FIG. 2.

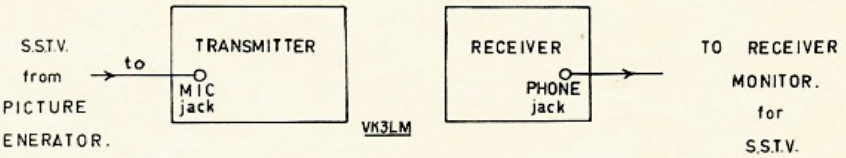

FIG. 3.

PROPOSED S.S.T.V. SPECIFICATIONS

Australia—Not to exceed the bandwidth of d.s.b. = 6 kHz.

1. **S.s.b. normal bandwidth** = 3 kHz.
2. **S.s.t.v.** = 2.3 kHz.
3. **Tone** = 1500 Hz.
   (a) Shifted between 1200 Hz. for sync. information.
   (b) Modulated upwards 2300 Hz. for picture information.
   e.g. **1500 Hz. = black level**
   2300 Hz. = white level
   Tones in between = shades of grey.
   5-m.s. burst of 1200 Hz. = horizontal sync.
   30-m.s. burst of 1200 Hz. = vertical sync.
4. **Horizontal sweep rate** = 60 Hz. supply = 15 Hz.
   Horizontal sweep rate = 50 Hz. supply = 16.66 Hz.
5. **Vertical sweep rate** = 60 Hz. supply = 8 secs.
   Vertical sweep rate = 50 Hz. supply = 7.2 secs.
6. **Resultant resolution** of 120 lines per frame.
7. **Picture size**: Approx. 4¼" sq. Format 1:1.
8. **Direction of scan** (50 and 60 Hz. supply):
   Horizontal—left to right.
   Vertical—top to bottom.

Above as per International and Australian.

INTERNATIONAL S.S.T.V. (NET) FREQUENCIES

(VK Amateurs should note that the 80 and 40 metre frequencies are outside the Australian frequency allocations and thus cannot be used for transmitting purposes.)

80 metres = 3845 kHz.
40 metres = 7200 kHz.
20 metres = 14230 kHz.

Other frequencies are in use from time to time on 21 and 28 MHz.

SUGGESTED AUSTRALIAN (NET) FREQUENCIES

80 metres = 3.650 MHz.
40 metres = 7.125 MHz.
20 metres = 14.230 MHz.
6 metres = 52.6 MHz.
2 metres = 144.675 MHz.

—Draft prepared by J. Wilson, VK3LM/T.

RECEIVING THE PICTURE

Receiver tuning is carried out in the normal way as for receiving an s.s.b. signal, but slightly more care in tuning is desirable (see Fig. 3). When off-tuned on s.s.b. the pitch of the voice will be either higher or lower than natural voice resonances because of the tuning error that exists; in s.s.t.v. the above fault would cause incorrect contrast, resulting in the picture being either greyer or blacker than normal.

EQUIPMENT

The monitor (see Fig. 1) is basically the first functional requirement of s.s.t.v. as anyone can become involved in receiving the pictures to keep abreast of current activity. In fact, you can have an entire video programme recorded on tape, plus the monitor and you can then take part in two-way involvement with slow-scan.

The first major requirement for monitor construction is to obtain a 5, 6 or 7 inch c.r. tube with a P7 long persistance phosphor. Although many of these tubes have been available via disposal sources, supplies are quickly drying up. Some units, such as Indicator type 101 or Indicator 101/109 16089 ex Albertros contained a CV1650 tube and a very sensitive deflection yoke with line drive assembly. This meant that a lot of the mechanical construction was already done. The CV1650 is a 6" English tube giving reasonably good picture detail.

Those who may be lucky enough to have a 5FP7 tube in the junk box will have the king of the disposal tubes as these give sharp brilliant pictures with about 6 kv. applied to its anode. In fact, any P7 type phosphor tubes can be used and should you have a suitable tube, it can be re-gunned and re-phosphored for P7 at reasonable prices from picture tube re-gunning establishments in the various States.

One of the larger picture tube manufacturers here in Australia (name supplied—Ed.) will make a new tube, any size to your own specification, for approximately $5 more than the normal trade price for a one-off production.

Due to the 120-line resolution, picture size is rather small, being about 4¼" square format received on a 6" diameter tube. Larger pictures can be received but they become like a very coarse newspaper photo.

Shown elsewhere is an un-retouched photo taken from a commercial monitor 4¼" square format. Note the scan pin-cushion effect that occurs similar to the problem seen on most 25" tubes today (see Fig. 4).

The electronics for the rest of the monitor is rather conventional and can be built with almost any type of electronic components to suit the valve man, transistor man or IC king. Shown is a block diagram of a typical solid state monitor (Fig. 1).

First the deflection system will probably be magnetic and the best coils found were those from the old 70° Bush Simpson or early Classic 70° yokes. Focus can also be obtained by use of the magnetic assemblies obtained from old t.v's using the above yokes.

A simple monitor consists of several limiter amplifiers, a discriminator, sync. and video detectors, video amplifier and display c.r. tube. The sync. separator is followed by a one-shot multivibrator (mono-stable) discharge circuits and deflection circuits. A power supply provides different potentials of plus and minus 10 volts or so with the common being at earth potential and e.h.t. supply to suit the type of c.r. tube used.

At this stage, no attempt has been made to publish a constructional article on a s.s.t.v. monitor as it has been found that most Amateurs prefer to use bits and pieces found on hand and to select sections of circuits from various articles to suit their own needs.

A very sophisticated circuit was received from Mike Tallant, W6MXV, who can supply PC boards, ICs, etc., on a commercial basis to Amateurs throughout the world. A photograph on the front cover shows how the entire monitor is constructed on two printed circuit boards, one being approximately 6" square containing all the limiter, sync., video amp. circuits, etc., and the second board approximately 6" x 3" containing the high and low voltage regulated supplies. Interested people requiring more information on these boards could write direct to Mike Tallant, W6MXV (ex W9HWX) at 2843 Mayglen Way, San Jose, California, 95133, U.S.A.

Call of ZL1AOY received by John VK3LM (white letters on black background) on FT200. Strength S8, noise-free picture. Sync. pulling seen on picture. Taken from monitor of Mac VK3YEO.

An article that has appeared enabling Amateurs to become active with smaller equipment outlays is "Slow Scan TV Adaptor for Oscilloscopes" by Bill Briles, W7FEN, published in "QST," June 1970, pages 46-50.

At the conclusion of this article is a list of references where interested people in all aspects and development of slow-scan can obtain information and build up a file of all known published records to date.

Some commercial gear is available State-side for about $US1,200. This includes both monitor and camera and is marketed under the name of "Robot". The only other commercial unit made is built by a one-man firm operated by W2EKY and the monitor is known as the "Eky". The do-it-yourself kit sells for about $US300 with PC boards available for $US10.

PICTURE TRANSMISSION

The first requirement of picture transmission is to satisfactorily scan the slide, photograph or negative in a light-tight box. Two methods of achieving this are shown in Fig. 6. Suggestion 1 shows the reflective method of scan, where the photograph is scanned directly by the c.r.t. and the reflection picked up by the photo-multiplier tubes (usually 931As, etc.).

In suggestion 2, direct scanning methods are tackled. Here the image must be either a transparency or a negative, as the light must pass through the image to reach the photo-multiplier. A very simple way to get going by this method is to use a 35 mm. slide projector where all optics and slide mechanisms are provided. All that is required is to remove the projector lamp from the lamp house and insert a photo-multiplier tube. The c.r.t., usually a 3FP7 tube, can be mounted a suitable distance in front of the objective lens. The above is then assembled in a light-tight box and connected to the rest of the electronics.

A typical block diagram of a slow-scan television picture generator is shown in Fig. 7. Here the c.r.t. scanning is achieved by the usual vertical and horizontal deflection circuits (note

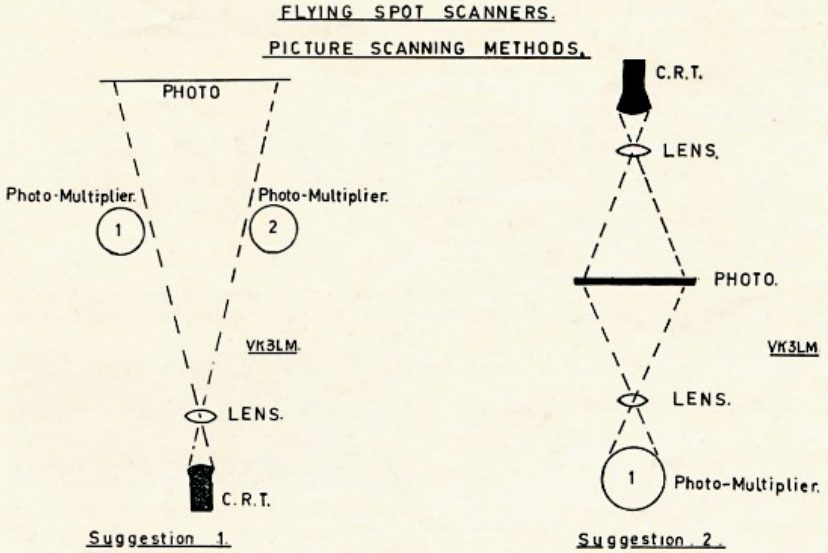

FIG. 6.

the 3FP7 is an electrostatic tube). Output from the photo-multiplier is fed to the modulator then on to the sub-carrier oscillator where output is then taken to the transmitter phone jack as audio out.

Connection to the transmitter is simply by insertion directly into the microphone jack (see Fig. 3) where correct levels are set by the microphone gain control on the transmitter to obtain normal transmitter operation. Of course, should closed circuit pictures be required then the output of the scanner would be fed directly into the monitor input jack.

As can be seen, equipment is not outside the reach of the enthusiastic Amateur. Construction and layouts are not critical. With care and proper construction techniques, excellent results should be obtained.

Included in this article are photographs taken from pictures received from Ian ZL1AOY on 14230 kHz. on ¼" audio tape on a Bigsten Cassette recorder and fed into a monitor constructed by Mac VK3YEO. The photographs were taken with a Leica camera fitted with a bellows and mounted 5" from a 5FP7 tube. Readers should note that these photographs are early results and picture quality should improve as the equipment is further perfected. In U.S.A., some Amateurs are starting to develop s.s.t.v. in **colour**, so the enthusiast should prepare for the future.

PARTS AVAILABILITY

Most of the components used are readily available from most radio parts suppliers throughout the Commonweath. The most difficult parts to obtain are the P7 phosphor tubes. During the latter years, many P7 tubes were available via several disposal sources. Ham Radio Supplies had 40 indicator units complete with h.v. power supplies and a 6" tube. During the last couple of months, these units have been bought by prospective s.s.t.v. operators. However, Ken Milbourn of Ham Radio Supplies, 104 Highett Street, Richmond, Vic., has in stock fifty 3FP7 new tubes suitable for either small monitors or flying spot scanners. The price is $2 direct or plus packing and posting should this be required.

Ken also has in stock at the time of writing, several 3FP7 tubes mounted in shields with filter fitted to the screen face. These are available for $5 complete direct, or plus packing and postage should this method of delivery be preferred.

As mentioned earlier in this article, if you have suitable 5" or 6" tubes, these can be re-gunned and re-phosphored at any t.v. re-gunning manufacturer. However, new tubes (8", 11" or 12") can be supplied made to your specifications with P7 phosphor in a one-off unit (name and address supplied—Ed.). The price of the tube will be trade price plus $5 for the special order. Delivery is approximately two weeks from receipt of order.

Deflection yokes and other components will depend on the type of c.r.t. used. If electrostatic tubes are used, then no deflection components are required. As stated previously, suitable early type t.v. deflection coils can be obtained from obsolete television receivers.

For the flying spot scanners, photo-multipliers such as type 931A have been plentiful through normal disposal sources.

This about winds up our first article on Slow-Scan Television—the Australian Way. Included in the insert are detailed proposed specifications of s.s.t.v. in Australia with a list of proposed net frequencies of operation for Australia. You will note that some of the American frequencies are not suitable for transmitting in Australia as these are outside our operating frequencies.

We would like to know how you feel about s.s.t.v.; are you interested in forming an s.s.t.v. club? Do the proposed frequencies suggested pose any problems within your particular State? All communications on the subject should be sent to either of the authors whose addresses are given elsewhere in the article.

Further results and developments will be published in "Amateur Radio" in the near future.

Listed below is a reference of all known articles published on s.s.t.v. for those people wishing to obtain more information on the subject or propose to compile a comprehensive folder on s.s.t.v.

Picture: CQ call by Jim K1MEA/4 (white on black), photographed from monitor of VK3YEO. Signal strength less than S1. Noise level and interference heavy. Note adjacent channel interference seen on the picture, also signal QSB at the bottom of the picture.

LIST OF KNOWN PUBLISHED INFORMATION ON S.S.T.V.

"A Solid State S.S.T.V. Monitor," W9LUO, "QST," March 1971.
"A Compact Slow-Scan Monitor," WA2BCW, "QST," March 1964.
"A Slow-Scan Television Signal Generator," K7YZZ, "73 Mag.," July 1969.
"A Slow-Scan Television Picture Generator," K7YZZ, "73 Mag.," Oct. 1967.
"Conversion Fast-Scan to Slow-Scan Television," W3YZC, "Ham Radio," July 1971.
"Narrow Band Image Transmission" (two parts), W4ZII, "QST," Aug., Sept. 1958.
"Magnetic Deflection for S.S.T.V.," WB2ZIV, "73 Mag.," Feb. 1971.
"An S.S.T.V. Patch Box," W4UMF, "73 Mag.," Feb. 1971.
"A Slow-Scan Vidicon Camera (three parts), WA2BCW, "QST," June, July, Aug. 1965.
"An S.C.F.M. System of S.S.T.V.," WA2BCW two parts), "QST," Jan., Feb. 1961.
"Slow-Scan with Regular Vidicons," WA2EMC, "QST," Feb. 1968.
"S.S.T.V. Budget Television for Hams," W2NSD, "Electronics Ill.," July 1971.
"Slow-Scan T.V. Viewing Adaptor for Oscilloscopes," W7FEW, "QST," June 1970.
"Slow-Scan Image Transmission—A Progress Report," WA2BCW, "QST," April 1960.
"Twenty Metre Slow-Scan Tests," "QST," June 1969.

(Continued on Page 15)

SLOW-SCAN TELEVISION (S.S.T.V.) CLUB

We would like to hear from all Amateurs and S.w.l's interested in SLOW-SCAN, and who would be interested in forming a **Slow-Scan Group in VK.** It is hoped that active participation in s.s.t.v. on both h.f. and v.h.f. in VK will result.

All interested Amateurs may contact either VK3LM/T, John A. Wilson, 14 Merrilong St., Ringwood East, Vic., 3135 (phone 870-5132) or VK3YEO, A. H. (Mac) McKibbon, 27 Beverley St., East Doncaster, Vic., 3109 (phone 842-1411).

BLOCK DIAGRAM of an S.S.T.V. PICTURE GENERATOR.

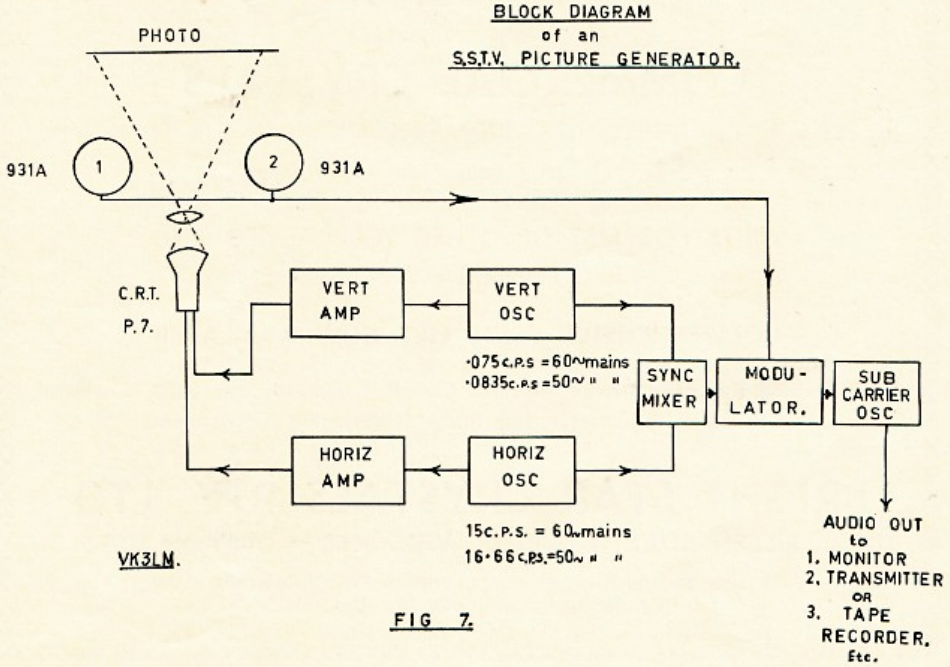

FIG 7.

A V.H.F. 25-WATT POWER AMPLIFIER

G. L. C. JENKINS, VK3ZBJ, and H. L. HEPBURN,† VK3AFQ*

In the March, April and June 1971 issues of "A.R." the authors described a 146 MHz. f.m. transceiver. The June issue made mention of the use of the B3/12 and B12/12 C.T.C. power devices marketed in Australia by Varian. Further up in the power level, Varian market the C.T.C. B25/12 and the C.T.C. B40/12 which, at 146 MHz., can be expected to give 25/30 and 45/50 watts of r.f. output when powered from a 13.6v. rail.

This article is intended briefly to describe an "add on" 146 MHz. p.a. which uses the B25/12 device.

The circuit diagram is given in Fig. 1 and a close basic resemblance can be seen to the 2/3 watt driver and 10/15 watt p.a. originally described. Whilst, electrically, the resemblance is real, there is an equally real divergence when the components used are considered. In the 25 watt unit the d.c. and r.f. currents flowing are high and the components used have to handle these increased currents.

In the units so far built and tested the two input fixed capacitors (6.8 pF. and 22 pF.) are Philips ceramic beads as is the 22 pF. fixed capacitor in the collector circuit of the B25/12. The two 33 pF. fixed capacitors between output and ground are unencapsulated silver micas. The 9 pF. trimmer in the input circuit is a Shinmei unit, while the 3/30 pF. trimmer in the collector circuit is an El-Menco type T50210 20 pF. mica compression trimmer. The performance of this trimmer in high current duty at 146 MHz. is significantly in excess of that obtained with the more usual type of ceramic compression trimmer. The El-Menco component is marketed by A.E.E. Capacitors, of Bell Street, Preston, Vic.

The base choke is a Philips 2½ turn RFC type 4312-020-36700 modified by replacing the original wire by two parallel wires through the ferrite core. The ferrite used is "lossy" at the frequencies involved and use of alternative ferrites (such as F29 coil former slugs) can lead, at the best, to low efficiency in the p.a. and, at the worst, to breakdown of the transistor. It is essential that the choke used has a low Q and a low impedance at the operating frequency. Use of high Q or high Z chokes may generate voltages at the base which could exceed the ratings of the transistors.

RFC3 is used only as an h.t. line decoupling device and here an F29 slug on a single wire answers the purpose well.

RFC2 is air wound to the dimensions given.

The whole unit is mounted on a piece of (suitably etched) circuit board 4" x 2⅛" used with the copper side uppermost. The components are soldered direct on to a metal heat sink with the main fixing bolt of the transistor making good thermal contact to the heat sink. If one assumes an r.f. output of 25 watts and a d.c. efficiency of, say, 60%, then it can be readily appreciated that some 15 watts of the d.c. input energy must be dissipated as heat. Those attracted by the mathematics involved may care to do some sums, but in practice a piece of ⅛" thick aluminium, painted matt black, at least the same dimensions as the p.c.b. itself, is required.

The general method of tuning up is the same as that described in the April 1971 issue of "A.R." for the 3 and 10 watt power stages. As a guide to performance, the unit now described when running from a 12.6 volt supply draws 3.3 amps. d.c. Under these conditions the measured r.f. output is 25 watts and the d.c. to r.f. conversion 60%.

* 17 Noel Street, East Brighton, Vic., 3187.
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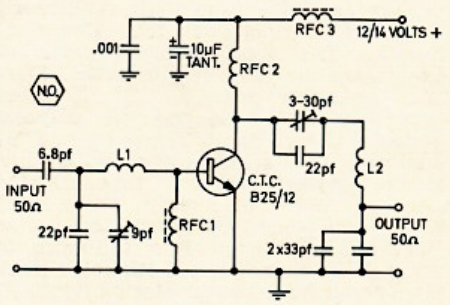


25 WATT 144 MHz POWER AMPLIFIER—FIG. 1

L1—3 turns 18 gauge tinned copper, 3/16-in. i.d. 3/8-in. long.
L2—2 turns 18 gauge tinned copper, 5/16-in. i.d., 1/2-in. long.
RFC1—Philips 4312-020-36700 ferrite RFC—modified, see text.
RFC2—4 turns 16 gauge tinned copper, 1/4-in. i.d., 1/2-in. long.
RFC3—Neosid F29 slug on single wire.

SIMPLE TRANSISTOR TESTER FOR THE BEGINNER

HARDY SCHONING, VK2BBA*

INTRODUCTION

If you use semiconductors rather than valves in constructing equipment, you are bound to collect, over a period of time, a considerable number of odd transistors and diodes. These finally end up in a box and when you want one either you cannot ascertain the number or you cannot trace it in your data book.

Most of these odd bits would be quite unsuitable for building a 2 metre rig, but would have many applications in the low frequency ranges if only you knew what they were.

A small instrument is described which will enable you to determine the polarity (NPN or PNP), d.c. gain h_{FE} and the leakage current I_{CEO} as well as the polarity of diodes.

All the values given are for silicon transistors—

$$(V_{BE} = 0.6V.)$$

However, the tester can be used for both silicon and germanium devices without change.

PRINCIPLE OF TRANSISTOR D.C. GAIN MEASUREMENT

As the beginner will already know, the current gain of a transistor in common emitter circuit is—

$$h_{FE} = I_C \div I_B$$

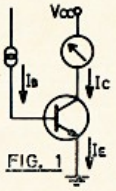


FIG. 1

If the base current is set at a simple value (1 mA. or 100 μA.) and you measure the collector current I_C, the equation may be solved easily as follows—

I_B set to 1 mA.
I_C reads on meter 39 mA.
$h_{FE} = 39$ mA. $\div$ 1 mA.
$= 39$

In other words, you can take the reading on the collector mA. meter as d.c. gain h_{FE}—you can take the mA. meter scale as it is for a h_{FE} scale. We can introduce the further following simplification—

We know $I_E = I_C + I_B$
and $h_{FE} = I_C \div I_B$
so $I_B = I_C \div h_{FE}$
then $I_E = I_C + (I_C \div h_{FE})$
or $I_E = I_C [1 + (1 \div h_{FE})]$

The gain h_{FE} of most transistors is greater than 20, so the fraction $1 \div h_{FE}$ is 0.05, and getting smaller with increasing gain.

We, therefore, say the expression $1 \div h_{FE}$ is, for our purpose, small enough to be disregarded. We simplify our tester by saying

$$I_E = I_C$$

I_E is easier to measure.

DESIGN OF THE TRANSISTOR TESTER

If you understand the principle of the gain measurement, there should be no problem in designing a simple circuit. Here is one example which you could choose yourself—

$V_{CC} = 3$ V.
$I_B = 100$ μA.

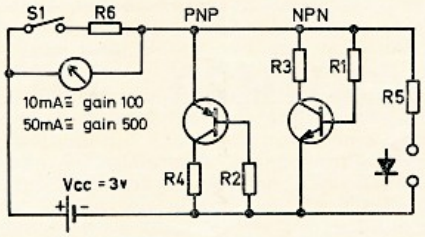
Instrument = 10 mA. = h_{FE} 100 f. scale
2. Range = 50 mA. = h_{FE} 500 f. scale
so 1 mA. would be h_{FE} of 10
2 mA. „ „ „ „ 20 etc.

Assume: Base-Emitter voltage
$V_{BE} = 0.6$ V.
(for silicon transistor, slightly less for germanium).

Find with simple calculation:

$R1 = R2 = (V_{CC} - V_{BE}) \div I_B$
$= (3V. - 0.6V.) \div 100$ μA.
$R1 = R2 = 24K\ \Omega$.

I used 22K Ω 2% because it is a standard value. You can make the resistor out of one 22K Ω and 2.2K Ω if you like to be more precise.



TRANSISTOR TESTER WITH TWO SOCKETS
FIG. 2

In Fig. 2, R3 = R4 are in the circuit for current limiting purposes in case of a wrong connection. I_C maximum of 60 mA. is allowed for. This current is permissible for smaller transistors for short periods, thus—

$R3 = R4 = V_{CC} \div I_C$ max.
$= 3$ V. $\div$ 60 mA.
$R3 = R4 = 50\ \Omega$.

Insert, therefore, the nearest values you have available, 56 Ω or 47 Ω $\pm$10%, $\frac{1}{4}$ watt or more. Be careful not to wire R3 or R4 as a common resistor in series with the battery, as this would influence the base current I_B.

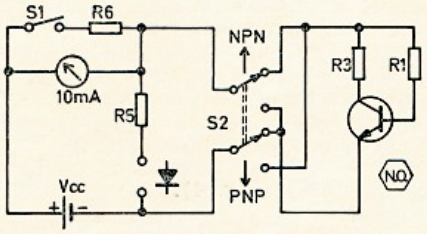
For diodes two more connections are brought out. R5 limits the forward current.

$R5 = (V_{CC} - V_F) \div I_C$ max.
$= (3$ V. $- 0.6$ V.$) \div 10$ mA.
$R5 = 240\ \Omega$.

For R5 I chose 330 Ω $\pm$10% because I had one handy.

To extend the gain reading to 500 you shunt the meter with R6. This resistor value must depend upon the resistance of your milliammeter. Calibrate it for a full scale of 50 mA. with your multimeter.

In this range R3 and R4 will reduce the collector-emitter voltage by high gain transistors, but the tester still will give a reasonable indication of the gain.



TRANSISTOR TESTER WITH ONE SOCKET AND NPN-PNP SWITCH FIG. 3

A small ($1\frac{1}{2}$" x $1\frac{1}{2}$") miniature edgewise panel meter was purchased cheaply with a 0-10 linear scale. This was calibrated against a multimeter for two ranges, 10 mA. full scale for a gain of 100, 50 mA. full scale for a gain of 500. You could take out two connector terminals so as to use your multimeter as a milliammeter. In any event, multiply your mA. reading by 10 to obtain the d.c. gain of the transistor.

Two TO18 sockets were handy so these were used instead of PNP-NPN switch. Terminals for the diode test were two 6BA screw heads. S1 is a slide switch, on-off. All of this was built with two UM-3A dry batteries in a cheap little plastic box.

Care taken in assembly will ensure a good appearance and the plastic will take many hard knocks. If you have only one socket, use a switch to change the polarity as shown in Fig. 3. If you have no sockets, a 3-wire outlet with clips will be satisfactory. An on-off switch for the battery is not required, it will last many months.

USING THE TESTER WITH UNKNOWN TRANSISTORS

To determine the connections of the unknown transistor, look up the type of case in the handbook or similar publication, but, if you cannot find it, take a guess bearing in mind that the metal can may often be the collector connection.

I_{CEO} Test: Bend the base wire up; plug the collector and emitter into the NPN-PNP socket. There should be no current reading on either polarity; if there is, the transistor is leaky. If there is a full scale deflection on one polarity and not the other, you do not have the right connection on the transistor, i.e. you have either the collector-base or emitter-base junction, so keep trying to find the two poles which give no reading. These are emitter and collector. The third wire is the base.

NPN or PNP? Connect the collector lead—or the one you think it is—to the collector terminal and connect the base to the emitter terminal. If there is no current indication, you have the

(Continued on Page 15)

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THE PHASE-LOCK LOOP

PART ONE

R. F. DANNECKER,* VK4ZFD

This is the first of two articles written with a view to acquainting Amateurs with the principles of the phase-lock loop. Applications of the phase-lock loop are outlined and the use of a phase-lock loop as an optimum f.m. discriminator is discussed.

The basic phase-lock loop is shown in block diagram form in Fig. 1. It comprises three basic components:—

(1) A phase detector (Fig. 2),
(2) A low pass filter (Fig. 3),
(3) A voltage controlled oscillator (v.c.o.) (Fig. 4).

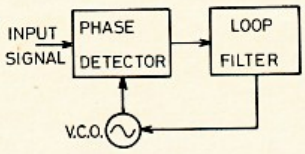

FIG. 1. BASIC PHASE LOCK LOOP

The phase of a periodic input signal and that of the v.c.o. is compared by the phase detector; output of the phase detector is a measure of the phase difference between its two inputs. This difference voltage is then filtered by the loop filter and applied to the v.c.o. Control voltage on the v.c.o. changes the frequency in a direction that reduces the phase difference between the input signal and the v.c.o.

When the loop is "locked" the control voltage is such that the frequency of the v.c.o. is exactly equal to the average frequency of the input signal.

Suppose now that the input signal carries information in its phase or frequency; this signal is inevitably corrupted by additive noise. Suppose also that the v.c.o. is the "local oscillator" in some form of receiver. The task of such a phase-lock "receiver" is to reproduce the original signal while removing as much of the noise as possible. If the "local oscillator" could be locked to the input signal and made insensitive to the random noise on this signal, then the input signal could be reconstructed.

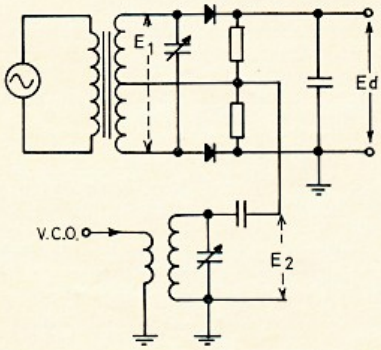

FIG. 2. TYPICAL PHASE DETECTOR

If the signal input is Er sin $(2\pi ft)$ and the v.c.o. is E2 cos $(2\pi ft + \theta)$ then the output of the detector is Ed $\approx$ 2E2 sin θ or for small θ, Ed $\propto$ E2 θ for E2 $>$ E1, i.e. the output voltage is proportional to the phase difference between the signal input and the v.c.o.

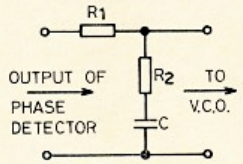

FIG. 3. TYPICAL LOW PASS FILTER

The transfer function of this filter is

$$H(S) = \frac{S\,C\,R2 + 1}{S\,C\,(R1 + R2)} + 1$$

where S is the complex variable.

The input to the loop is a noisy signal, whereas the output of the v.c.o. is a cleaned-up version of the input. To suppress noise, the error output signal from the phase detector is averaged over some length of time by the loop filter, and the averaged error is then used to control the frequency of the oscillator. It is reasonable, therefore, to consider the loop as a kind of filter that passes signals and rejects noise.

Two important characteristics of the filter are that the bandwidth can be very small and the filter automatically tracks the signal frequency. Narrow bandwidth is capable of rejecting large amounts of noise; it is not at all unusual for a phase-lock loop to recover a signal deeply embedded in noise.

One application of the phase-lock loop is as the local oscillator in a synchronous or homodyne receiver. In essence this receiver consists of nothing but a local oscillator, a mixer, and an audio amplifier. To operate, the oscillator has to be adjusted to exactly the same frequency as the carrier of the incoming signal which is then converted to an intermediate frequency of zero Hz. Output of the mixer contains demodulated information that is carried as sidebands by the signal. Correct tuning of the local oscillator is essential to synchronous reception; any frequency error whatsoever will hopelessly garble the information. Furthermore, phase of the local oscillator must agree, very closely, with the received carrier phase. In other words, the local oscillator must be phase-locked to the incoming signal.

Another common application arises in television receivers. The flywheel synchronisers in present-day t.v. receivers are really phase-locked loops.

Space use of phase-lock began with the first American (Russian?) artificial satellites. These carried 10 mW. c.w. transmitters; received signals were correspondingly weak. Furthermore, Doppler shift made the exact frequency uncertain. At the 108 MHz. frequency used, the Doppler shift could range over a ±3 KHz. interval. Hence an ordinary fixed-tuned receiver would require at least a 6 KHz. bandwidth

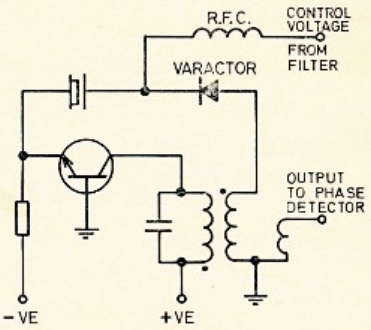

FIG. 4. TYPICAL VOLTAGE CONTROLLED OSCILLATOR

for a signal that could be contained in something like a 6 Hz. bandwidth. This entails a noise penalty (noise is directly proportional to bandwidth) of 1,000 times, i.e. 30 dB. Such penalties are intolerable and that is why narrow-band phase-locked tracking receivers are used.

Noise can be rejected by a narrow-band filter, but if the filter is fixed, the signal will almost never be within the passband. For a narrow filter to be usable it must be capable of tracking the signal. A phase-locked loop is capable of providing both the narrow bandwidth and tracking that are needed. Current applications of phase-lock include:—

(Continued on Page 15)

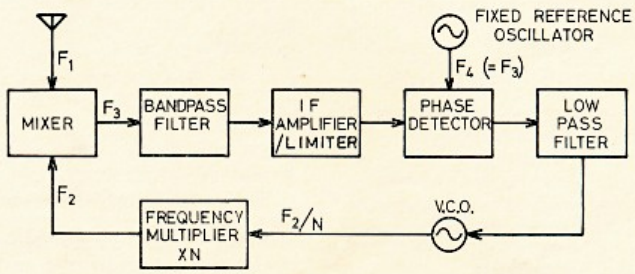

FIG. 5 BASIC PHASE-LOCK RECEIVER

* 52 Pohlman Street, Southport, Qld., 4215.

AUSTRALIAN DX CENTURY CLUB AWARD

OBJECTS

1.1 This Award was created in order to stimulate interest in working DX in Australia and to give successful applicants some tangible recognition of their achievements.

1.2 This Award, to be known as the "DX Century Club" Award, will be issued to any Australian Amateur who satisfies the following conditions.

1.3 A certificate of the Award will be issued to the applicants who show proof of having contacted one hundred countries, and will be endorsed as necessary, for contacts made using only one type of emission.

REQUIREMENTS

2.1 Verifications are required from one hundred different countries as shown in the Official Countries List.

2.2 The Official Countries List will be published annually in "Amateur Radio" and will be amended from time to time as required. Should a country be deleted from the Countries List at any time, members and intending members will be credited with such country if the date of contact was before such deletion.

2.3 The commencing date for the Award is 1st January, 1946. All contacts made on or after this date may be included.

OPERATION

3.1 Contacts must be made in the H.F. Band (Band 7) which extends from 3 to 30 MHz., but such contacts must only be made in the authorised Amateur Bands in Band 7.

3.2 All contacts must be two-way contacts on the same band. Cross band contacts will not be allowed.

3.3 Contacts may be made using any authorised type of emission for the band concerned.

3.4 Credit may only be claimed for contacts with stations using regularly-assigned Government call signs for the country concerned.

3.5 Contacts made with ship or aircraft stations will not be allowed, but land-mobile stations may be claimed provided their specific location at the time of contact is clearly shown on the verification.

3.6 All stations must be contacted from the same call area by the applicant (except as below), although if the applicant's call sign is subsequently changed, contacts will be allowed under the new call sign providing the applicant is still in the same call area.

If the applicant moves to another call area, contacts must be made from within a radius of 150 miles of the previous location to qualify for award purposes. If the distance of the new location from the old exceeds a radius of 150 miles, a separate application for a new award must be made claiming only contacts made from the new location.

3.7 All contacts must be made when operating in accordance with the Regulations laid down in the "Handbook for the Guidance of Operators of Amateur Wireless Stations" or its successor.

VERIFICATIONS

4.1 It will be necessary for the applicant to produce verifications in the form of QSL cards or other written evidence showing that two-way contacts have taken place.

4.2 Each verification submitted must be exactly as received from the station contacted, and altered or forged verifications will be grounds for disqualification of the applicant.

4.3 Each verification submitted must show the date and time of contact, type of emission and frequency band used, the report and the location or address of the station at the time of contact.

4.4 A check list must accompany every application setting out the details for each claimed station in accordance with the details required in Rule 4.3.

APPLICATIONS

5.1 Applications for membership shall be addressed to the **Federal Awards Manager, W.I.A., P.O. Box 67, East Melbourne, Vic., 3002**, accompanied by the verifications and check list with sufficient postage enclosed for their return to the applicant, registration being included if desired.

5.2 A nominal charge of 25c, which shall also be forwarded with the application, will be made for the issue of the certificate to successful applicants who are non-members of the Wireless Institute of Australia.

5.3 Successful applicants will be listed periodically in "Amateur Radio". Members of the D.X.C.C. wishing to have their verified country totals, over and above the one hundred necessary for membership, listed will notify these totals to the Federal Awards Manager.

5.4 In all cases of dispute, the decision of the Federal Awards Manager and two officers of the Federal Executive of the W.I.A. in the interpretation and application of these Rules shall be final and binding.

5.5 Notwithstanding anything to the contrary in these Rules, the Federal Council of the W.I.A. reserves the right to amend them when necessary.

AUSTRALIAN V.H.F. CENTURY CLUB AWARD

OBJECTS

1.1 This Award has been created in order to stimulate interest in the V.H.F. bands in Australia, and to give successful applicants some tangible recognition of their achievements.

1.2 This Award, to be known as the "V.H.F. Century Club" Award, will be issued to any Australian Amateur who satisfies the following conditions.

1.3 Certificates of the Award will be issued to the applicants who show proof of having made one hundred contacts on the V.H.F. bands, and will be endorsed as necessary, for contacts made using only one type of emission.

REQUIREMENTS

2.1 Contacts must be made in the V.H.F. Band (Band 8) which extends from 30 to 300 MHz., but such contacts must only be made in the authorised Amateur Bands in Band 8.

2.2 In the case of the authorised bands between 30 and 100 MHz., verifications are required from one hundred different stations, at least seventy of which must be Australian. The Amateur Bands 50 to 54 MHz. and 56 to 60 MHz. will be counted as one band for the purposes of the Award.

2.3 In the case of the authorised Amateur Band between 100 to 200 MHz., verifications from one hundred different stations are required.

2.4 It is possible under these rules for one applicant to receive two certificates, one for each of the authorised Amateur Bands nominated in Rules 2.2 and 2.3.

2.5 The commencing date for the Award is 1st June, 1948. All contacts made on or after this date may be included.

OPERATION

3.1 All contacts must be two-way contacts on the same band, and cross band contacts will not be allowed.

3.2 Contacts may be made using any authorised type of emission for the band concerned.

3.3 Fixed stations may contact portable/mobile stations and vice versa, but portable/mobile station applicants must make their contacts from within the same call area.

3.4 Applicants, when operating either portable/mobile or fixed, may contact the same station licensee, but may not include both contacts for the same type of endorsement.

3.5 Applicants may only count one contact for a station worked as a limited licensee with a Z or Y call sign who is subsequently contacted as a full A.O.C.P. holder.

3.6 All stations must be contacted from the same call area by the applicant (except as below), although if the applicant's call sign is subsequently changed, contacts will be allowed under the new call sign providing the applicant is still in the same call area.

If the applicant moves to another call area, contacts must be made from within a radius of 150 miles of the previous location to qualify for award purposes. If the distance of the new location from the old exceeds a radius of 150 miles, a separate application for a new award must be made claiming only contacts made from the new location.

3.7 All contacts must be made when operating in accordance with the Regulations laid down in the "Handbook for the Guidance of Operators of Amateur Wireless Stations" or its successor.

VERIFICATIONS

4.1 It will be necessary for the applicant to produce verifications in the form of QSL cards or other written evidence showing that two-way contacts have taken place.

4.2 Each verification submitted must be exactly as received from the station contacted, and altered or forged verifications will be grounds for disqualification of the applicant.

4.3 Each verification submitted must show the date and time of contact, type of emission and frequency band used, the report and the location or address of the station at the time of contact.

4.4 A check list must accompany every application setting out the following details:—

4.4.1 Applicant's name and call sign, and whether a member of the W.I.A. or not.

4.4.2 Band for which application is made, and whether special endorsement is involved.

4.4.3 Where applicable, the date of change of call sign and previous call sign.

4.4.4 Details of each contact as required by Rule 4.3.

4.4.5 The applicant's location at the time of each contact if portable/mobile operation is involved.

4.4.6 Any relevant details of any contact about which some doubt might exist.

APPLICATIONS

5.1 Applications for membership shall be addressed to the **Federal Awards Manager, W.I.A., P.O. Box 67, East Melbourne, Vic., 3002**, accompanied by the verifications and check list with sufficient postage enclosed for their return to the applicant, registration being included if desired.

5.2 A nominal charge of 25c, which shall also be forwarded with the application, will be made for the issue of the certificate to successful applicants who are non-members of the Wireless Institute of Australia.

5.3 Successful applicants will be listed periodically in "Amateur Radio". Members of the V.H.F.C.C. wishing to have their verified totals, over and above the one hundred necessary for membership, listed will notify these totals to the Federal Awards Manger.

5.4 In all cases of dispute, the decision of the Federal Awards Manager and two officers of the Federal Executive of the W.I.A. in the interpretation and application of these Rules shall be final and binding.

5.5 Notwithstanding anything to the contrary in these Rules, the Federal Council of the W.I.A. reserves the right to amend them when necessary.

AUSTRALIAN D.X.C.C. COUNTRIES LIST

	Phone	C.W.
A2—Botswana		
AC3—Sikkim		
AC4—Tibet		
AC5—Bhutan		
AP—East Pakistan		
AP—West Pakistan		
BV—Taiwan		
BY—China		
C2—Nauru		
C3—Andorra		
CE—Chile		
CE9AA-AM, FB8Y, KC4, LA, LU-Z, OR4, UA1, VK0, VP8, ZL5, ZS1, 8J—Antarctica		
CE0A—Easter Is.		
CE0X—San Felix		
CE0Z—Juan Fernandez		
CM, CO—Cuba		
CN—Morocco		
CP—Bolivia		
CR3—Portuguese Guinea		
CR4—Cape Verde Is.		
CR5—Principe, Sao Thome		
CR6—Angola		
CR7—Mozambique		
CR8—Portuguese Timor		
CR9—Macao		
CT1—Portugal		
CT2—Azores		
CT3—Madeira		
CX—Uruguay		
DA, DJ, DK, DL, DM—Germany		
DU—Philippine Is.		
EA—Spain		
EA6—Balearic Is.		
EA8—Canary Is.		
EA9—Rio de Oro		
EA9—Ceuta and Melilla		
EI—Ireland		
EL—Liberia		
EP—Iran		
ET—Ethiopia		
F—France		
FB8W—Crozet Is.		
FB8X—Kerguelen Is.		
FB8Z—Amsterdam and St. Paul Is.		
FC—Corsica		
FG7—Guadeloupe		
FH8—Comoro Is.		
FK8—New Caledonia		
FL8—French Somaliland		
FM7—Martinique		
FO8—Clipperton Is.		
FO8—French Oceania		
FP8—St. Pierre and Miquelon		
FR7—Glorioso Is.		
FR7—Juan de Nova		
FR7—Reunion Is.		
FR7—Tromelin		

	Phone	C.W.
FS7—Saint Martin		
FW8—Wallis and Futuna Is.		
FY7—French Guiana and Inini		
G—England		
GC—Guernsey and Dependencies		
GC—Jersey Is.		
GD—Isle of Man		
GI—Northern Ireland		
GM—Scotland		
GW—Wales		
HA—Hungary		
HB9—Switzerland		
HB0—Liechtenstein		
HC—Ecuador		
HC8—Galapagos		
HH—Haiti		
HI—Dominican Republic		
HK—Columbia		
HK0—Bajo Nuevo		
HK0—Malpelo Is.		
HK0—San Andres and Providencia		
HL, HM—Korea		
HP—Panama		
HR—Honduras		
HS—Thailand		
HV—Vatican		
HZ, 7Z—Saudi Arabia		
I, IT—Italy		
IS1—Sardinia		
JA, JH, JR, KA—Japan		
JD1—Minami Torishima		
JD1—Ogasawara and Kazan Is.		
JT—Mongolia		
JW—Svalbard		
JX—Jan Mayen		
JY—Jordan		
K, KN, W, WA, WB, WN—United States of America		
KB6—Baker, Howland and American Phoenix Is.		
KC4—Navassa Is.		
KC6—Eastern Caroline Is.		
KC6—Western Caroline Is.		
KG4—Guantanamo Bay		
KG6—Guam		
KG6—Mariana Is.		
KH6, WH6—Hawaiian Is.		
KH6—Kure Is.		
KJ6—Johnston Is.		
KL7, WL7—Alaska		
KM6—Midway Is.		
KP4, WP4—Puerto Rico		
KP6—Palmyra Group, Jarvis Is.		
KR6, 8—Ryuku Is.		
KS4—Swan Is.		
KS4B, HK0—Serrana Bank and Roncador Cay		
KS6—American Samoa		
KV4, WV4—Virgin Is.		

	Phone	C.W.
KW6—Wake Is.		
KX6—Marshall Is.		
KZ5—Canal Zone		
LA—Norway		
LU—Argentina		
LX—Luxembourg		
LZ—Bulgaria		
MP4B—Bahrein		
MP4D, T—Trucial Oman		
MP4M—Sultinate of Muscat and Oman		
MP4Q—Qatar		
OA—Peru		
OD—Lebanon		
OE—Austria		
OH—Finland		
OH0—Aland Is.		
OJ0—Market Reef		
OK—Czechoslovakia		
ON—Belgium		
OX—Greenland		
OY—Faroe Is.		
OZ—Denmark		
PA—Netherlands		
PJ—Netherlands Antilles		
PJ—Sint Maarten		
PY—Brazil		
PY0—Fernando de Noronha		
PY0—St. Peter and St. Paul's Rocks		
PY0—Trinidade and Martim Vaz Is.		
PZ—Surinam		
SK, SL, SM—Sweden		
SP—Poland		
ST—Sudan		
SU—Egypt		
SV—Crete		
SV—Dodecanese		
SV—Greece		
TA—Turkey		
TF—Iceland		
TG—Guatemala		
TI—Costa Rica		
TI9—Cocos Is.		
TJ—Cameroun		
TL—Central African Republic		
TN—Congo Republic		
TR—Gabon		
TT—Chad		
TU—Ivory Coast		
TY—Dahomey		
TZ—Mali		
UA1-6, UK1, 3, 4, 5, 6A, E, H, I, J, L, P, U, W, X, Y, UW1-6—European Russian S.F.S.R.		
UA9, 0, UK9, UW9, 0—Asiatic R.S.F.S.R.		
UA1—Franz Josef Land		
UA2, UK2F—Kaliningradsk		
UB5, UK5—Ukraine		
UC2, UK2A, C, I, L, O, S, W—White Russian S.S.R.		
UD6, UK6C, D, K—Azerbaijan		
UF6, UK6F, O, V—Georgia		
UG6, UK6G—Armenia		
UH8, UK8H—Turkoman		

	Phone	C.W.
UI8, UK8A, C, D, F, G, I, L, O, T, U, Z—Uzbek		
UJ8, UK8J, R—Tadzhik		
UL7, UK7—Kazakh		
UM8, UK8M, N—Kirghiz		
UO5, UK5O—Moldavia		
UP2, UK2B, P—Lithuania		
UQ2, UK2G, Q—Latvia		
UR2, UK2R, T—Estonia		
VE, VO—Canada		
VK—Australia		
VK2—Lord Howe Is.		
VK4—Willis Is.		
VK9AA-MZ—New Guinea		
VK9AA-MZ—Papua		
VK9NA-NZ—Norfolk Is.		
VK9XA-XZ—Christmas Is.		
VK9YA-YZ—Cocos Is.		
VK0—Heard Is.		
VK0—Macquarie Is.		
VP1—British Honduras		
VP2A—Antigua, Barbuda		
VP2D—Dominica		
VP2E, K—Anguilla		
VP2G—Grenada and Dependencies		
VP2K—St. Kitts, Nevis		
VP2L—St. Lucia		
VP2M—Montserrat		
VP2S—St. Vincent and Dependencies		
VP2V—British Virgin Is.		
VP5—Turks and Caicos Is.		
VP7—Bahama Is.		
VP8—Falkland Is.		
VP8, LU-Z—South Georgia Is.		
VP8, LU-Z—South Orkney Is.		
VP8, LU-Z—South Sandwich Is.		
VP8, LU-Z, CE9AN-AZ—South Shetland Is.		
VP9—Bermuda Is.		
VQ1—Zanzibar		
VQ9—Aldabra Is.		
VQ9—Chagos Is.		
VQ9—Desroches		
VQ9—Farquahar		
VQ9—Seychelles		
VR1—British Phoenix Is.		
VR1—Gilbert, Ellice and Ocean Is.		
VR2—Fiji Is.		
VR3—Fanning and Christmas Is.		
VR4—Solomon Is.		
VR5—Tonga		
VR6—Pitcairn Is.		
VS5—Brunei		
VS6—Hong Kong		
VS9K—Kamaran Is.		
VU—Andaman and Nicobar Is.		
VU—India		
VU—Laccadive Is.		
XE, XF—Mexico		
XF4—Revilla Gigedo		
XT—Voltaic Republic		
XU—Cambodia		
XW—Laos		
XZ—Burma		

	Phone	C.W.
YA—Afghanistan		
YB, YC, YD—Indonesia		
YI—Iraq		
YJ—New Hebrides		
YK—Syria		
YN—Nicaragua		
YO—Rumania		
YS—El Salvador		
YU—Yugoslavia		
YV—Venezuela		
YV0—Aves Is.		
ZA—Albania		
ZB2—Gibraltar		
ZD3—The Gambia		
ZD5—Swaziland		
ZD7—St. Helena		
ZD8—Ascension Is.		
ZD9—Tristan da Cunha & Gough Is.		
ZE—Rhodesia		
ZF1—Cayman Is.		
ZK1—Cook Is.		
ZK1—Manahiki Is.		
ZK2—Niue		
ZL—New Zealand		
ZL/A—Auckland and Campbell Is.		
ZL/C—Chatham Is.		
ZL/K—Kermadec Is.		
ZM7—Tokelaus		
ZP—Paraguay		
ZS—South Africa		
ZS2—Prince Edward and Marion Is.		
ZS3—South-West Africa		
1M—Minerva Reefs		
1S—Spratly Is.		
3A—Monaco		
3B6, 7—Agalega and St. Brandon		
3B8—Mauritius		
3B9—Rodriguez		
3C—Equatorial Guinea		
3C0—Annobon		
3V—Tunisia		
3W, XV—Vietnam		
3X, 7G—Republic of Guinea		
3Y—Bouvet Is.		
4S7—Ceylon		
4U—I.T.U. Hq. Geneva		
4W—Yemen		
4X, 4Z—Israel		
5A—Libya		
5B4, ZC4—Cyprus		
5H—Tanzania		
5N—Nigeria		
5R—Malagasy Republic		
5T—Mauritania		
5U—Niger Republic		
5V—Togo		
5W—Samoa		
5X—Uganda		
5Z—Kenya		
6O—Somali Republic		
6W—Senegal		
6Y—Jamaica		
7O—South Yemen		

	Phone	C.W.
7P—Lesotho		
7Q—Malawi		
7X—Algeria		
8P—Barbados		
8Q6, VS9M—Maldive Is.		
8R—Guyana		
8Z4—Saudi Arabia/Iraq Neutral Zone		
9A1, M1—San Marino		
9G—Ghana		
9H—Malta		
9J—Zambia		
9K—Kuwait		
9L—Sierra Leone		
9M2, 4—West Malaysia		
9M6, 8—East Malaysia		
9N—Nepal		
9Q—Republic of the Congo		
9U—Burundi		
9V—Singapore		
9X—Rwanda		
9Y—Trinidad		
——Abu Ail, Jabal at Tair		
——Blenheim Reef		
——Geyser Reef		
——Maria Theresa Reef		
——Melish Reef		

DELETED COUNTRIES LIST

	Phone	C.W.
C9—Manchuria (prior 16/9/63)		
CN2—Tangier (prior 1/7/60)		
CR8—Damao, Diu (prior 1/1/62)		
CR8—Goa (prior 1/1/62)		
EA9—Ifni (prior 13/5/69)		
ET2—Eritrea (prior 15/11/62)		
FF8—French West Africa (pr. 7/8/60)		
FI8—French Indo China (pr. 21/12/50)		
FN—French India (prior 1/11/54)		
FQ8—French Equ. Africa (pr. 17/8/60)		
I1—Trieste (prior 1/4/57)		
I5—Italian Somaliland (prior 1/7/60)		
JZ0—Nether. New Guinea (pr. 1/5/63)		
PK1, 2, 3—Java (prior 1/5/63)		
PK4—Sumatra (prior 1/5/63)		
PK5—Netherlands Borneo (pr. 1/5/63)		
PK6—Celebes & Moluc. Is. (pr. 1/5/63)		
UN1—Karelo-Finnish Rep. (pr. 1/7/60)		
VO—Newfoundland (prior 1/4/49)		
VQ6—Brit. Somaliland (prior 1/7/60)		
VS4—Sarawak (prior 16/9/63)		
VS9H—Kuria Muria (pr. 29/11/67)		
ZC5—Brit. North Borneo (pr. 16/9/63)		
ZC6—Palestine (prior 2/7/68)		
ZD4—Gold Coast (pr. 6/3/57)		
9K3, 8Z5—Kuwait/Saudi Arabia Neut. Zone (pr. 15/12/69)		
9M2—Malaya (prior 16/9/63)		
9S4—Saar (prior 1/4/57)		
9U5—Ruanda-Urundi (between 1/7/60 and 1/7/62 only)		

THE PHASE-LOCK LOOP

(Continued from Page 10)

(1) Perfect a.f.c. (automatic frequency control) of receivers;
(2) P.c.m. telemetry bit synchronisation;
(3) Frequency multipliers and dividers;
(4) Coherent transponders;
(5) Noisy oscillators can be enclosed in a loop and locked to a clean signal; if the loop has wide bandwidth, the oscillator tracks out its own noise and the output is greatly cleaned up.
(6) A phase-locked loop can be used as a frequency demodulator; in which service it gives superior performance to conventional discriminators.

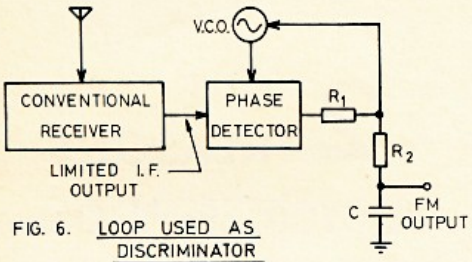

FIG. 6. LOOP USED AS DISCRIMINATOR

A simplified diagram of a superheterodyne phase-lock receiver is shown in Fig. 5. The principal difference between this and a conventional receiver is that the local oscillator tracks the input signal, allowing a much narrower i.f. bandwidth. The smallness of the bandwidth is limited only by error and stability considerations.

Consider now the output of the phase detector; this is proportional to the phase difference between the i.f. signal and that of the local reference oscillator. As the input signal varies in frequency when modulated, so the output of the phase detector will vary in sympathy with the modulation in order that the v.c.o. track with the incoming signal to keep the frequency and phase of the i.f. signal correct. Thus this voltage from the phase detector is a demodulated version of the f.m. signal. Direct use of the phase-detector output is unsatisfactory since it would be very noisy and unfiltered. Normally the demodulated signal is taken from the loop low-pass filter.

A simpler method for using a phase-lock loop as an f.m. demodulator is shown in Fig. 6; performance is of course not as good as a fully fledged phase-lock receiver, but practical advantages are obvious.

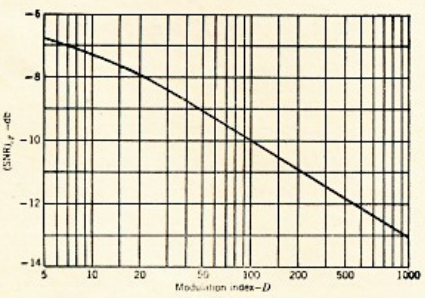

Fig. 7.—Threshold for Random Modulation (Ref. 1).

The threshold of a conventional discriminator is considered to be +10 dB. SNR (signal-to-noise ratio) at the input to the limiter, whereas the threshold SNR for the phase-lock loop demodulator is indicated in Fig. 7.

CONCLUSIONS

The following conclusions may be drawn regarding discriminators:—

(1) At high input SNR's there is no appreciable difference between phase-locked and conventional types.
(2) A phase-locked loop will have a lower threshold than the +10 dB. of a conventional disriminator.
(3) The improvement that can be gained depends on the modulation of the input signal.
(4) For best results, the loop should be specifically designed for the modulation actually present.
(5) Premodulating filtering can provide better performance.

In the second article on this subject, a practical f.m. demodulator using an IC will be discussed. This is of the "add on" variety as in Fig. 6.

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1. Gardner, F. M.: "Phaselock Techniques," Wiley, 1966.
2. Lindsey, W. C.: "Optimum Frequency Demodulation," J.P.L. Space Programmes Summary No. 37-26, vol. iv., pp. 227-237, April 1964.
3. Lathi, B. P.: "Communication Systems," Wiley, N.Y., 1968.
4. McMullen, C. W.: "Communication Theory Principles," Macmillan, N.Y., 1968.
5. Harman, W. W.: "Principles of the Statistical Theory of Communication," McGraw Hill, N.Y., 1963.

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SLOW-SCAN T.V.

(Continued from Page 7)

"S.S.T.V.—A Taped Lecture in France, 1969," SM0BVO, "73 Mag.," Dec. 1969.
"The Vidicon Minicamera," W8TYY, "73 Mag.," Apr. 1968.
"Slow-Scan **Colour** Transmission," W4UMF, "73 Mag.," Jan. 1970.
"A Procedure for Reception of Slow-Scan **Colour Pictures** using Additive Synthesis," "73 Mag.," Nov. 1969.

LIST OF ABBREVIATIONS USED

S.S.T.V.—Slow-Scan Television.
Disc.—Discriminator.
Det.—Detector.
Amp.—Amplifier.
Integ.—Integrator.
Sync.—Synchronising.
Vert.—Vertical.
Horiz.—Horizontal.
Disch.—Discharge (saw tooth).
Scan.—Scanning.
L.T.—Low tension.
H.T.—High tension.
E.H.T.—Extra high tension.
m.s.—Milli-second.
Osc.—Oscillator.
Photo.—Photograph or picture.
Photo-multiplier.—Photo-sensitive tube (light sensitive).
Lens.—Optical system.
C.r.t.—Cathode ray tube.
P7—Speed of phosphor coating on c.r.t.

ACKNOWLEDGMENTS

Ian ZL1AOY—Transmissions of picture information via 14230 MHz.
Jack Smith, of Ringwood—Photography of s.s.t.v. pictures.
Mike Tallant, W6MXV—IC circuits of s.s.t.v. monitor and board photograph.
Articles from "QST," 73 Magazine" and "Ham Radio".

TRANSISTOR TESTER

(Continued from Page 9)

right socket or polarity. If there is any current reading, change to the other polarity. If there is no current reading in either polarity, the transistor is a reject. Base open!

h_{FE} d.c. Gain Measurement: Now attach all three connections of your transistor and read the gain on the meter—up to 100 on the 10 mA. scale, up to 500 on the 50 mA. scale. If a very small gain is shown, you have probably erroneously transposed the collector and emitter leads, so merely interchange the two staying in the same polarity as determined previously.

Testing Known Transistor: As what you have done may appear confusing, make some tests with a known transistor to give you a better understanding, but there is really no need to do this if you know the connections of your transistor. In this case, you plug the transistor into each socket and get a gain reading in the right polarity, but nothing in the other. By disconnecting the base there should be no current. If there is a current reading, the device is a reject—leaking!

Testing a Diode: To test a diode, connect it to the diode terminals; in the forward direction it will conduct but by changing the diode connections there should be no reading.

If the device conducts in both directions, even a very small current, or there is no current at all, it is not a diode.

CONCLUSION

Naturally, there are many more parameters to be measured on a semiconductor, particularly for the more serious designer. However, for most of the simple circuits and for the beginner who wants to wet his feet in solid state, this tester is not only very helpful as a start but it takes very little effort and time to build.

With a higher voltage (V_{CC} = 9v.) you will improve the I_{CEO} test, but not all points under the previous heading apply, due to the early breakdown of the base emitter junction. Additional switches could, of course, extend the ranges, etc.

This simple addition of the tester has been found very handy and satisfactory and a good return for the small effort and investment.

ACKNOWLEDGMENT

Sincere thanks to Peter Dodd, VK3CIF, for editing this article.

SUBSCRIPTIONS DUE

All members of the W.I.A. are reminded that annual subscriptions are now due and should be paid promptly to their Divisional Secretary. Non financial members will not receive a copy of "A.R.," and back copies may not be available upon request. To preserve continuity of your files of "A.R.," please pay your annual subscription now.

W.I.A. Novice Licensing Investigation Committee

Supplementary Report, Oct. '71

COMMITTEE MEMBERS

R. C. Black, VK2YA (Chairman); P. J. Healy, VK2APQ; K. Howard, VK2AKX; D. Jeanes, VK2BSJ; K. Watson, VK2BLW.

INTRODUCTION

Since the original Novice Licensing Report was submitted to the Federal Convention last Easter a considerable amount of further material has been received from groups and individuals interested in the proposals. "Amateur Radio" has published points of view relative to (i) the desirability and otherwise of introducing a lower-level form of Amateur transmitting licence, and (ii) criticism of matters included in the original Report. In adddition, letters, petitions and verbal opinions have been received in considerably greater quantity than those available prior to the compilation of the original Report. It is stressed that the submissions favouring a lower-level form of licence again greatly exceeded those opposing such a move. Furthermore, it is noted that the strongest support comes from (a) radio clubs which are conducting training courses for the A.O.C.P., and (b) persons situated in remote country areas away from clubs and other licensed Amateurs.

COMMITTEE RECOMMENDATIONS REGARDING MATTERS FOR NEGOTIATION WITH THE P.M.G. DEPT.

(a) **That the P.M.G. authorities should be asked to approve a trial period of FIVE years during which a lower-level licensing scheme should be operated and, at the expiration of that period, an assessment should be made of its value to the Amateur Service and to the public interest..**

Comment: This suggestion was offered by Mr. O'Burtill, VK3WW, and Mr. Shawsmith, VK4SS, in letters to the Editor of "A.R." The pro-Novice section of the Amateur movement and other interested persons should be pleased to have an opportunity of proving their point; the lower-level licensees should be keen to demonstrate that such a scheme will function effectively; the radio clubs providing training courses would be able to assess the value of this grade of licence as a supplement to the theoretical and practical training provided by their courses; the persons who are unfavourably disposed towards Novice licensing will have to look forward to only a limited period of lower-level licensing IF the project proves to be unsuccessful.

At present the protagonists and opponents of the Novice concept have only overseas experience and unproven opinions on which to base their ideas. A trial period will provide a firm basis for the Amateur Service and the Licensing Authority to see "at first hand" the value—or otherwise—of the project. At the end of the trial period a conference of representatives of the P.M.G. Dept. and the Amateur Service could consider the desirability of (i) continuing the lower-level licensing under existing conditions, (ii) introducing modifications to the scheme as found desirable during the trial period, (iii) discontinuing the lower-level grade of licence.

(b) **That of the various suggested schemes for an amended licensing structure, preference should be given to that which involves THREE grades of Amateur transmitting licences.**

Comments: Suggestions involving four and five grades have been received by the committee and each contains special features of merit to the Amateur Service. However, this committee feels that simplicity of administration, organisation and examining should be paramount and that an additional licence should be recommended in terms of conditions specified in Appendices A, B and C to this Supplementary Report.

(c) **That the suggested name of the proposed lower-level certificate should be "The Amateur Operator's Restricted Certificate of Proficiency" and should, therefore, be indicated by the abbreviation "A.O.R.C.P."**

Comment: There has been considerable opposition to the use of the term "Novice". Some regard it as an undesirable Americanism; others state that we Australians should be able to contrive our own designation; others regard the word "Novice" as connoting a standard of knowledge which is too low to maintain the prestige of the Amateur Service. The Eastern Zone of Victoria has recommended the "Restricted" designation and this committee strongly supports this usage.

(d) **That suggestions involving the use of radio telephony for "Restricted" licensees should be discarded and that the original proposals of "CW ONLY" should be maintained.**

Comment: In most overseas countries where lower-level licensing operates "CW ONLY" is the accepted situation. In U.S.A. the original voice facility for Novice operators on one band was withdrawn and "CW ONLY" is the current situation.

(e) **That there should be NO LIMITATION on tenure for "Restricted" licensees.**

Comment: This will be subject to review at the end of the trial period and perhaps it may be felt at that stage that a limited tenure might be preferable. It is considered that the restrictions imposed on transmitting privileges will in themselves provide sufficient incentive for holders of such licences to study further and to gain operating and practical experience leading ultimately to higher Amateur qualifications. Some correspondents to "Amateur Radio" have expressed the fear that in a "limited tenure" scheme there MAY be a tendency for "time-expired" licensees to retain their equipment and engage in unlicensed transmitting. While this committee does not admit that this is an insuperable problem, it is considered that there are other valid reasons for NOT imposing a time limit.

There may be some "Restricted" operators whose educational limitations may make them incapable of progression to A.O.C.P. level, but who could make a useful contribution to the Amateur Service nevertheless; others may have work and family commitments which debar them from completing A.O.C.P. requirements in a limited period; others may find complete satisfaction in the hobby by c.w. operating and by improving their operating speeds well beyond the examination specifications; others again may use the "Restricted" facility for offering advice and instruction to newcomers to the bands. However, this committee is of the opinion that a great majority of "Restricted" operators will eventually move to A.O.L.C.P. and/or A.O.C.P. status.

(f) **That a distinctive range of call signs be suggested for identification of "Restricted" Amateur stations, such as "VK3RAA to VK3RZZ".**

Comment: It is evident that such special identification should be possible and this committee recommends the suggestion of the Eastern Zone in Victoria regarding the call sign proposal.

(g) **That "Restricted" licensees should be permitted to operate as Fixed, Portable and Mobile station operators.**

Comment: Some correspondents queried the safety aspect of Mobile operation. However, it was not envisaged that a vehicle should be driven at the same time as the driver operated a Morse key. It is suggested that the "Restricted" operator would operate the Mobile station as a PASSENGER. This phase of Amateur Radio offers valuable technical problems and situations within the scope of the proposed "Restricted" licence.

(h) **That the original suggestion regarding the submission of character references by applicants for lower-level licences should be deleted.**

(i) **That proposals for the use of v.h.f. bands by "Restricted" licensees should not be accepted.**

Comment: The committee feels that v.h.f. techniques and transmitters offer greater problems than those associated with h.f. operation. It is considered that the use of v.h.f. channels could produce t.v.i. problems to a greater extent than would be likely with h.f. allocations.

(j) **That the listing of suggested frequencies for "Restricted" operation as indicated in Appendix C of this Supplementary Report should be used as a basis for negotiation with the P.M.G. Dept.**

Comment: There have been criticisms of the original frequency proposals in the Report submitted to Easter Convention. Such criticism was anticipated and welcomed.

First, there was opposition to the use of the 1800 kHz. band. This was considered at length by the committee which includes operators experienced in this area. Local nets with low-powered transmitters appear to be quite practicable "Restricted" licensees would find it easy to adapt broadcast receivers for this band.

Second, the committee admits that the DX operators have a good case for wishing to retain the areas near the band edge for their special activity. Accordingly, the committee offers revised suggestions in Appendix C.

Third, the principle of keeping "Restricted" operators off the 14 MHz. band has been well supported and no variation is suggested.

Fourth, no objection has been received to the original proposals for the 21 MHz. band and opinions have been received approving the principle of overlapping with American Novice and Japanese Telegraphy allocations.

Fifth, in the original Report no listing of the 11 metre band for lower-level operation was made. It has been suggested that the area might be made available for "Restricted" operation, subject to "guard bands" at both ends of the existing allocation.

Sixth, it has been suggested by Mr. M. Bazley, VK6HD, that "there is no activity between 28,100 and 28,500 and active groups in this section would help us keep this frequency allocation". Also, the Japanese Telegraphy licensees use the segment from 28,000 to 29,7000 kHz. and this would offer Australian "Restricted" operators an opportunity to contact their counterparts.

RECOMMENDATIONS FOR ACTION BY THE WIRELESS INSTITUTE OF AUSTRALIA

(a) **That in the event of a "Restricted" licensing scheme being introduced, each Division should devise means whereby such Amateur operators could be assisted, encouraged and further instructed to higher Amateur status.**

(b) **That "Restricted" licensees should be permitted to hold FULL membership in the Institute.**

Comment: In the original Novice Report this committee recommended that lower-level licensees should be held to ASSOCIATE membership. This suggestion was in deference to the anticipated reluctance of established A.O.L.C.P. and A.O.C.P. members to share FULL membership with "apprentice operators". However, this committee has been quite surprised by the willingness of existing Amateurs to support the concept of "Full membership for Restricted operators" that we must, therefore, recommend this variation from the original suggestion.

(c) **That "Restricted" operators should be encouraged to participate in the activities of the Key Section.**

Comment: As "Restricted" operators will use the c.w. mode exclusively, it is considered by this committee that they would make a major contribution to building the Key Section into a very strong W.I.A. activity. However, it is suggested that the Key Section administration should make the "Restricted" operators feel that the Section has their welfare in mind, is interested in their problems, and will make some constructive efforts to encourage the art of Morse operating among the newcomers.

APPENDIX A

Proposed amended conditions for the award of Amateur Operators' Restricted Certificates of Proficiency

1. That candidates must pass Morse Code receiving and sending tests at an equivalent speed of FIVE words per minute.
2. That candidates must pass a written examination in P.M.G. Regulations at the same standard as for A.O.L.C.P. and A.O.C.P. candidates.
3. That candidates may gain "conceded" passes for the "Restricted" Certificate by gaining between 50 and 69 per cent. of the possible marks in the A.O.C.P. Theory examination.
4. That candidates for the "Restricted" Certificate must conform to the same age requirements as for A.O.L.C.P. and A.O.C.P. candidates.

APPENDIX B

Proposed Transmitting Privileges for Holders of "Restricted" Certificates

1. 10 watts input to final stage of transmitter(s).
2. Crystal control.
3. C.w. operation ONLY.
4. No time limit on holding "Restricted" licences.
5. Operation permitted under fixed, portable and mobile (passenger-operator) conditions.
6. Frequency allocations approved by the P.M.G. Department from the listing in Appendix C herewith.

APPENDIX C

Proposed Amended Frequency Allocations for use by Holders of "Restricted" Certificates

1. 1805 to 1855 kHz.
2. 3525 to 3570 kHz.
3. 7025 to 7065 kHz.
4. No operation on 14 MHz. band.
5. 21,030 to 21,150 kHz.
6. 27.00 to 27.20 MHz. (observing guard band principle).
7. 28,100 to 28,500 kHz.
8. No operation above 28,500 kHz.

NEW CALL SIGNS

SEPTEMBER 1971

VK3LP—L. T. A. Pearson, "Jubilee Cottage," Main Rd., Campbell's Creek, 3451.
VK3NT—R. J. L. Kelly, 62 Kilby Rd., Kew East, 3102.
VK3NZ—N. D. White, 59 Charles St., Ascot Vale, 3032.
VK3SC—W. G. H. Sargent, 11 Barkley St., Camperdown, 3260.
VK3AAX—F. Rogers, Ballarat Rd., Rockbank, 3335.
VK3ACO—D. G. W. Vernall, 46 Anderson Pde., Bundoora, 3083.
VK3ADM—D. M. Rosenfield, 5 Lygon St., South Caulfield, 3162.
VK3AMI—V. Cornett, 7 Adeney St., North Balwyn, 3104.
VK3AOK—R. F. Davis, 242 Grant St., South Melbourne, 3205.
VK3ATR—A. R. Atkins, 29 Flinders St., East Keilor, 3042.
VK3BCT—R. D. Trickett, Lot 13, Pelican Ave., West Meadows, 3047.
VK3ZDM—Croydon High School Electronics Club, C/o. 5 Macefield Ave., Mooroolbark, 3138.
VK3ZYZ—D. C. Parnell, Derril Rd., Moorooduc, 3933.
VK4CO—C. P. S. Wilks, 87 Main Rd., Marooochydore, 4558.
VK4NI—A. H. Nicholls, 179 Martyn St., Cairns, 4870.
VK4PH—N. G. Williams, Station: Tahiti Ave., Palm Beach; Postal: P.O. Box 224, Coolangatta, 4225.
VK4TU—K. W. Collins, Station: Portable; Postal: 15 McLean St., Goodiwindi, 4390.
VK4ZX—F. E. Earley, Range St., Mt. Lofty.
VK4ZIG—I. G. Morrison, 21 Abau St., Soldiers Hill, Mt. Isa, 4825.
VK4ZJI—J. B. Innes, 60 Peary St., Northgate, 4013.
VK4ZSS—S. S. Dellit, 23 Lorinya St., Mansfield, 4122.
VK6FE—B. M. Bain, 1 Falls St., Exmouth, 6707.
VK6GY—G. I. Guppy, 122 Dyson St., South Perth, 6151.
VK6KN—R. W. H. B. Jones, 61 Peoples Ave., Gooseberry Hill, 6076.
VK7RO—R. E. Rogers, 233 Bligh St., Warrane, 7018.
VK7ZRJ—R. S. Jarvis, 17 Araluen St., Geilston Bay, 7015.
VK8TH—T. M. Hester, 33 Roberts Cres., Alice Springs, 5750.
VK9CH—C. E. Harbour, P.O. Box 148, Kieta.
VK9ZDC—D. Clancy, P.O. Box 426, Port Moresby.
VK0RC—R. C. McPhee, Macquarie Island.

ALTERATIONS

VK3AX—H. D. Boast, 29 Havana Cres., Frankston, 3199.
VK3GM/T—T. G. Foster, 15 Wendouree Pde., Ballarat, 3350.
VK3HI—L. A. Grant, 23 Elliott St., Traralgon, 3844.
VK3QF—P. Dettman, 30 Hooper Cres., West Brunswick, 3055.
VK3RC—R. W. Hill, Station: Mia Mia Rd., Broadford, 3658; Postal: P.O. Box 48, Broadford, 3658.
VK3ARF—R. N. Fenton, 23 Grandview Gr., Rosanna, 3084.
VK3BAP—J. E. Nicholson, 10 Pickworth Gr., Dingley, 3172.
VK3BEQ—J. W. McCulloch, 17 Gap Rd., Riddell's Creek, 3431.
VK3BFD—A. A. George, Lot 162, Western Way, Narre Warren, 3805.
VK3YEQ—B. J. Kemp, 3 Cedar Crt., Glen Waverley, 3150.
VK3ZBC—B. G. Clift, 11 Morinda St., Ringwood East, 3135.
VK3ZFV—R. H. Baker, 37 Gerald St., Nunawading, 3131.
VK3ZIE/T—D. L. Seedsman, 16 Weder Cres., East Burwood, 3151.
VK3ZLK—W. H. Harder, Longmores Rd., Kilmore East, 3657.
VK3ZNZ—T. R. Powney, 91 The Terrace, Ocean Grove, 3226.
VK3ZTB—T. R. Bird, 9 Hosken St., North Balwyn, 3104.
VK3ZUX—K. C. James, 42 The Parade, Ascot Vale, 3032.
VK3ZVV—R. D. Miller, 4 Gordon St., Moorabbin, 3189.
VK4EI/R2—Gold Coast Radio Club, Station: Mr. L. Rabel's Property, Alpine Tce., Mt. Tamborine, 4272; Postal: P.O. Box 588, Southport, 4215.
VK4MA—A. E. Morrison, Fretwell Rd., White Rock, 4870.
VK4ZRY—R. W. Young (Dr.), 9 Boblynne St., Chapel Hill, 4069.
VK5HF—G. Harman, P.O. Box 95, St. Agnes, 5097.
VK5HS/T—K. J. Skewes. Addition of /T.
VK5VP—E. J. V. Willis, 42 Tusmore Ave., Tusmore, 5065.
VK5ZAD/T—G. C. Wiseman, 10 Mines Rd., Campbelltown, 5074.
VK5ZCB—T. R. Friebe, Lot 145, North St., Henley Beach, 5022.
VK6DB—D. F. J. Benck, 67 Omburman St., Wagin, 6315.
VK6FX—W. A. Fulton, Unit 12, Warren Gardens, 1 Rookwood St., Mt. Lawley, 6050.
VK6KQ—H. Sims, Lot 148, Ione Pl., Glenmere, North Whitford.
VK6WU—R. G. Jaeschke, 9 Duffy Rd., Hamersley, 6022.
VK7BM—W. S. Morrison, 19 Cornwall St., Rose Bay, 7015.
VK8ZFH—G. L. Stephens, P.O. Box 2274, Darwin, 5790.
VK9DH—D. G. Hallam, P.O. Box 56, Port Moresby.
VK9KA—O. S. Dahl, P.O. Box 5645, Boroko.
VK9RM—R. H. Murphy, C/o. Dept. of Posts and Telegraphs, Port Moresby.

CANCELLATIONS

VK3FN—B. M. Ferguson. Not renewed.
VK3KW—T. J. Keating. Not renewed.
VK3QG—C. K. Blake. Not renewed.
VK3AAB—A. B. Monks. Not renewed.
VK3ARB—R. A. Bouchier. Not renewed.
VK3BAG—R. J. L. Kelly. Now VK3NT.
VK3BDU—H. H. E. Westerhof. Transferred to Tas.
VK3BEW—N. D. White. Now VK3NZ.
VK3BFE—R. C. McPhee. Now VK0RC.
VK3YAN—J. W. Nairn. Not renewed.
VK3YDO—A. R. Atkins. Now VK3ATR.
VK3YET—P. M. Stewart. Not renewed.
VK3YPG—L. T. A. Pearson. Now VK3LP.
VK3ZOP—D. M. Rosenfield. Now VK3ADM.
VK3ZVL—D. G. Long. Not renewed.
VK4HF—C. H. Foley. Not renewed.
VK4JU—J. M. Joughin. Not renewed.
VK4MM—W. C. Mitchell (Dr.). Not renewed.
VK4RU—W. W. Newman. Not renewed.
VK4ZTU—K. W. Collins. Now VK4TU.
VK5ZM—K. M. Mathews. Not renewed.
VK5ZAA—J. D. Bishop. Not renewed.
VK6LJ—L. J. Smith. Not renewed.
VK6LL—C. E. Bishop. Deceased.
VK6ZAO—R. G. Smith. Not renewed.
VK7BH—B. H. Hall. Not renewed.
VK7ZDP—D. M. Potter. Not renewed.
VK7ZTK—A. J. H. Kendrick. Not renewed.
VK8AU—D. D. Tanner. Transferred to Vic.
VK8ZTH—T. M. Hester. Now VK8TH.
VK9VG—G. W. Van Galen. Transferred to Qld.

LICENSED AMATEURS IN VK

SEPTEMBER 1971

	Full	Lim.	Total	
VK0	12	1	13	
VK1	88	30	118	
VK2	1419	496	1915	
VK3	1310	665	1975	
VK4	521	208	729	
VK5	514	225	739	
VK6	370	134	504	
VK7	156	64	220	
VK8	37	12	49	
VK9	84	11	95	
	4511	1846	6357	Grand Total

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FEDERAL REPEATER SECRETARIAT NOTES

Welcome to 1972. We would like to open the column this month with an up-dating report on Repeaters, both in Australia and overseas. Later this year it is hoped to devote more space to detailed reports and we would invite all groups to submit details to the Federal Repeater Secretariat during January.

New Zealand has concentrated repeater activity to date with a.m. systems. A recent issue of "Break-In" carried an ad. "Rent a Rock . . . Visiting Christchurch?" Amateurs visiting in the Christchurch area are invited to use the local 2 mx Repeater. Input 144.65 MHz., output 145.775 MHz. a.m. Hire crystals for the input are available on 8.0361 or 36.1625 MHz. in HC6/U holders. Refundable deposit $8. Rental 50 cents first week, 20 cents each subsequent week, paid in advance. Crystals can be posted prior to your visit. Further details, write "Rent-a-Rock," P.O. Box 1733, Chrichchurch"—a good way to encourage activity.

America appears to have been looking at their problem of many Repeaters and the many channels in use. Most Amateur Radio publications continue to carry Repeater articles or reports in each issue. The equipment market continues to expand and a recent magazine carried some 15 different types available in the ads., including auto channel scanning receivers.

In Europe Repeaters operate in Germany, Switzerland (70 cm.), Denmark and Sweden. There are moves afoot to try and get them introduced into Great Britain.

Back on the local scene we are advised that the Gold Coast (Ch. 1) system is operating from a new site on Mt. Tamborine. It is identified by a keyer VK4EI/R2. (Info, VK4RZ)

From the west a report in the Nov. W.A. Bulletin by Graham VK6BY, outlined local activity. An experimental Repeater has been used for a while which stirred up some interest. The report went on to invite increased support to solve the problems of time, financial and technical. (An up-to-date report will be included in a future issue.)

South Australia has been discussing the frequency clash between segments of the Repeater system and the satellite requirements. This problem is being investigated by the Federal Repeater Secretariat and will be detailed in a future issue. (Thanks to VK5ZFQ and VK5QZ for reports.)

Northern Tasmania has put their Repeater on Mt. Barrow to air using a temporary channel allocation of 4. This will most likely change when the uncertainty of what moves are needed to avoid satellite channels of the future. The equipment is a T.C.A. 1674 50w. base. Ident. keyer VK7WI/R2. Co-axial dipoles at 80 ft. tx and 60 ft. rx. Filters are used on both the tx and rx. Coverage has been good with mobile contacts 100 miles south (near Hobart) and west to Burnie. Over water paths to VK3 have produced contacts in Gippsland, Bairnsdale, Melbourne and Geelong. Best DX was 380 miles to Ararat, Vic. (Thanks Peter VK7PF for details.)

In Victoria the traffic round Melbourne is heavy at times. The Melbourne Ch. 1 system was moved from the city area to the hills with an increase in coverage. The Geelong system (Ch. 4) puts a good signal into Melbourne but this produces problems when working the Gippsland repeater (also Ch. 4)—they both key up. Since the Bendigo site will also have good coverage towards Melbourne, it would appear that a third channel may be needed to reduce the problem. The Australis activity has been responsible for the introduction of a 2 mx to 70 cm. repeater. One has been licensed under the call VK3WIA/R4 for the duration of the present A-O-B project. (Thanks to VK3ZTA, VK3ASV and VK3YDB.)

In N.S.W., the Sydney Ch. 4 system has had some changes to its operation. An experimental voice identification was tried with mixed reception from the users. This has been replaced by an IC keyer (VK2WI-R) which transmits at 5-minute intervals. The repeater, which is located at VK2WI Dural, is to be used as the 2 mx f.m. broadcast channel from this site in the future. This is to overcome the desensitisation of the receiver by Ch. B.

The Central West repeater (VK2AOA) at Orange is still using Ch. 1 in, Ch. A out. This will be changed to Ch. 1 out on a date yet to be announced. A full licence has been granted to Newcastle (Ch. 4), but the system is not yet on air. Manned licences have been granted to Ch. 1 areas of Central Coast (Gosford) and Illawarra (Wollongong). Wollongong is on air using a high band commercial repeater, but a suitable high ground site has yet to be obtained.

Work is under way for Ch. 1 systems for the Lower North Coast (Taree-Port Macquarie); New England and Northern Tablelands (Tamworth-Moree) and Murrumbidgee-Murray (at Wagga). Further information about N.S.W. systems may be obtained from: Sydney VK2ZIM; Gosford VK2ZRQ; Newcastle VK2BSC; Orange VK2ZKN; Wollongong VK2AGV and VK2BHU; Port Macquarie VK2PA and VK2ZHE; Tamworth VKs 2ZAY, 2ZCV and 2DK; Wagga VK2YS; State Repeater Co-ordinator is VK2ZPJ.

VK1 (Canberra Radio Society) intends to develop a 2 mx beacon. Chosen frequency is 144.475, at 10w. solid state unit to an omnidirectional antenna. The site is yet to be selected. Sydney will have beacons on 6 and 2 mx—when approved—at VK2WI Dural. For this season there is a manned beacon on 52.2 under the call VK2II.

In a future report, the Federal Repeater Secretariat will discuss the possible need for a third repeater channel, the world requirements on 2 mx for an Amateur space allocation, the requirements for national band plans on 2 mx and above, the ideal frequency segments for beacons. We would like to thank the various groups and Amateurs for information supplied in 1971. We wish you all the best for 1972.

—Tim Mills, VK2ZTM, Chairman, Federal Repeater Secretariat, P.O. Box 342, Crows Nest, N.S.W., 2065.

Correspondence

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

TO ALL CW OPERATORS

Editor "A.R.," Dear Sir,

In this issue you will find a report by me reference a Commercial C.w. Intruder station ordering a VK Amateur off the 14 MHz. band. Does the underlined segment of that report incense you as much as it does I?

With the above in mind, I have considered forming a band of operators into what, for a better name, I intend calling "The QRM Brigade".

The object of this brigade would be to cause as much QRM as possible in a legitimate manner to these c.w. intruders. The intruders under I.T.U. regulations should not be operating in the sections of the bands under question, and therefore the Amateur operators would be quite within their rights to cause this QRM.

The exclusive Amateur bands are as follows: 28000 to 29700, 21000 to 21450, 14000 to 14250, and 7000 to 7100 kHz., and it would be deemed that the Commercials are causing QRM and not vice versa.

The idea is as follows: Competent c.w. operators to scan the bands, and when an intruder (or pair of intruders) is heard passing traffic, to zero beat that station and call "CQ". If another Amateur comes back to the CQ to conduct a QSO zero beat with the intruder until he moves, and then follow him until he moves out of the band, or QRT. If nobody comes back to the CQ, to keep calling "CQ" until either of the above occurs.

This has been discussed with our Authorities, and the unofficial green light given so long as it is carried out on exclusive Amateur segments of the bands and Amateurs operate within their licence requirements.

Are you interested in trying to rid our bands of this insidious Commercial interference? Will you be a member of the "QRM Brigade"?

A letter, or call on the air letting me know your feelings in the above would be appreciated.

—Alf Chandler, VK3LC.

MORSE TEST—AND AMATEUR LICENCE

Editor "A.R.," Dear Sir,

Would those amongst us in VK land who moan and groan about having to pass a Morse test in order to obtain a full A.O.C.P. please read this bit of information which appeared on page 704 of the R.S.G.B. magazine, "Radio Communication," Oct. 1971 issue:

"Philip West, Jnr., son of G3JPN, having learned the Morse Code characters in three days, attended classes with his father and passed his code test at Portshead on 12th June. At nine years of age he was the youngest applicant ever in Britain. Philip's younger sister, Pauline, can also copy c.w.—she is eight!"

'Garn, it's easy—when you try!

—Eric Trebilcock, L3042.

R.D. CONTEST

Editor "A.R.," Dear Sir,

I have enjoyed the R.D. Contest for many years and feel some new thoughts are in order.

In Nov. "A.R." comment is made on percentage participation. The low percentage in VK2 and VK3 is due to three factors: (1) Phantom calls, (2) Limited calls, (3) Scoring.

(1) Phantom calls I define as persons holding a licence but not operating. I personally know four of these who have not and never will get on the air, let alone work in a contest. There must be many more in both States.

(2) Limited calls. VK2 and VK3 have many of these and the results show poor participation. WHY? I believe that the contest offers little incentive to the Limited call. Can't we make a v.h.f. section in the contest which will attract these undoubtedly keen operators?

(3) The points scoring system discriminates against VK2 and VK3 in that we are worth only 1 or 2 points to the rest and thus have to work really hard for contacts. If the points given/received were more equitable perhaps more would enter.

Finally, any contest in which non participants control the scoring (no State had over 50% participation) is a farce, no matter how enjoyable it is for those taking part. Could some of our brighter members get together and devise a system which would:

(a) Encourage v.h.f. participation.
(b) Base scores on those taking part only.
(c) Equate points to reduce handicapping of any particular State.

—Mike O'Burtill, VK3WW.

"A PRECISION INSTRUMENT"

Editor "A.R.," Dear Sir,

I have seen the No. 10 Crystal Calibrator advertised in "Amateur Radio" as "a precision instrument". I differ with this statement as I recently converted one as per July 1967 "A.R." I found the dial to have a marked amount of backlash and on investigation found the springs, separating the two gear wheels driving the tuning condenser, to be slack. I could tension the springs and mesh the gears, but rotation of the dial caused one wheel to slip and the springs were again slack. No matter what I did, this always happened so I finally accepted it and use it this way.

I converted my set to a.c. operation, using two 6AM6s and a 6BE6. The 500 kHz. crystal oscillator was squegging until I put a 1.5 meg. resistor across the crystal. It finally operated rather well after adjusting the calibration to be correct.

—J. Kitchin, VK6TU.

"NIMBLE FINGERED DIAL TWISTERS"

Editor "A.R.," Dear Sir,

I feel I must write in defence of the "nimble fingered dial twisters" referred to by Mr. A. J. C. Thompson, VK4AT, in his letter on Novice Licensing ("A.R.," Nov. '71).

Having been licensed only three years, I am now in the above category (though not very nimble fingered), with a third-hand s.s.b. rig which cost less than $500. However, during these three years I spent several months on 5w. xtal-locked, and over 12 months with 40w. (mostly c.w.). In that time I have experimented with eight antennae and have plans for a ninth; helped one Amateur gain his licence, which led to the formation of a very active youth club; am now actively connected with a youth club; worked 110 countries and contributed at times to DX notes in "A.R."

This is no great achievement I will admit, but I submit that it is fairly typical of many now in the dial twisting category. There are many mansions in Amateur Radio, and even dial twisters learn something of propagation conditions, if nothing else. From what I have listened to on air, NO Amateur is ever satisfied with his set-up, and the great majority are ever ready to assist others. If we gain a little entertainment and pleasure in the process, surely this is a part of any hobby? So don't knock the dial twisters too hard, OM.

Finally, I am looking forward with pleasure to reading an article by Mr. Thompson on his infra red and ultra violet experiments in the near future.

—Jack R. Dunne, VK3AXQ.

NOVICE LICENSING

Editor "A.R.," Dear Sir,

In injecting a slightly different point of view into the recent licensing discussion, I make some observations not so much on the detail expressed in the report by Mr. Black's committee or in subsequent correspondence, but on the philosophy, or perhaps lack of it, associated with this investigation.

Probably the most significant and important sentence in the report reads as follows: "The introduction of a Novice licensing system could be a factor in increasing band occupancy, easing the pressure from outside interests, **and justifying the continued existence of the Amateur Service**". The bold type is mine, but the latter phrase is, I believe the criteria by which the whole argument for the justification of any new form of licensing or regulatory amendment, has any validity.

It is a pity the committee did not follow through and develop that theme. Instead, much has been said of the benefits to the W.I.A., and the Amateur Service generally by the introduction of another form of licensing, but they are low priority benefits, and do not in themselves serve as argument for making out a case for another licensing scheme.

In my view, the case for justifying the continued existence of the Amateur Service has yet to be made and does not depend on the introduction of yet another licensing grade, and goes much deeper than a comparison with other societies, a reform of leisure time activities, or the production of operators. In themselves they are desirable aims and a possible by-product of Amateur activity—but not a raison d etre.

One senses in the quote, that the authorship of the report believes that Amateur Radio faces a challenge. World wide majority feeling has been amply demonstrated at the recent I.T.U. Space Services Conference—a feeling that Amateur Radio is a hindrance and nuisance to the development of more important services and we have all read of the concessions grudgingly made for the Amateur Satellite Service.

Let me give an example of the type of thinking that results in these attitudes. The following quote was relayed to me by Tom Clarkson, ZL2AZ, who attended the Conference as a member of the I.A.R.U. Observer team. In discussing affairs outside the conference, the following comment was made by a delegate from a more enlightened administration: "In . . . we licence Amateurs, they go and buy a Japanese transmitter and talk to people all over the place—what you say about education and training may have applied once, but not now, there's nothing in it. And if facilities are given for Amateur satellites, the same thing will happen in space—some manufacturers will bring out package sets to talk by space relay and the same thing will happen again—we oppose these things. Even in highly developed countries the Amateurs have given up home construction."

I offer this quote to illustrate why Amateur Radio finds its arguments accepted with so much difficulty in international circles. What this delegate said is not so important—it is the implied condemnation of the Amateur Service that is important, and it is this attitude multiplied around the world that has, somehow, to be changed.

What to do? At the beginning I mentioned philosophy—a philosophy of a practical kind.

To me it seems that we have to take stock of our complete operation; we need a review of the Amateur Service not only locally but internationally with the terms of reference so wide as to cover everything known and imagined. However, whilst there is no guarantee that an answer can be found to the command "justify or perish", the conclusions reached must have some bearing on our attitudes to the future of Amateur Radio. Only then would it be appropriate to consider the proprietary of additional licensing in our structure.

—Peter Williams, VK3IZ.

Editor "A.R.," Dear Sir,

Since my name appears in most of the letters this month (Nov.) I obviously owe you a reply —as short as possible.

E. C. Brockbank: I could write a long comment on why I have no faith in a "low grade licence for a limited time," but you had better talk to me on the radio about this.

The technical standard of the A.O.C.P. in 1930 was the same as it is today, in proportion to the advances in science. Why should the P.M.G. change it?

A number of writers repeat: "A.O.C.P. without any preparation whatsoever". This is a quotation out of context. If you are a matriculation student AND you are interested in gaining an A.O.C.P. you will have read lots of radio magazines and the A.R.R.L. Handbook. Please read page 17 of "A.R." for Oct., 2nd last para, left hand column.

I have made constructive suggestions as to how the recommendations in the N.L. report may be amended.

Mick Rodden: With reference to the regulations in A.O.C.P., this is again out of context —if you are keen, you will have read the handbook from cover to cover and on the night before the examination, you will re-read and refresh memory on "Q" signals.

R. C. Black, VK2YA: My letter to Mr. Black in Oct. "A.R." is not unfriendly, it contains carefully researched facts and an offer to have a QSO with his new FT200.

I am sure he will be happy with the way we **anticipated** his request by publishing **his** letter—since my letter is a reply, in Oct. "A.R."

A. J. C. Thompson, VK4AT: I believe Mr. Thompson is anti-Novice and he definitely represents the "experimenter". However, why not have multi-groups in the W.I.A.?—experimenters, key section, phone section, h.f., v.h.f., u.h.f., a.m., s.s.b., slow/fast scan t.v., DX, and finally, "award collectors".

J. Wright: Parts of the Amateur bands were not lost due to limited use, this is a myth. It was caused by the inroads of big business which uses its powers to acquire parts of the spectrum for commercial use.

If more Amateurs were members of the W.I.A. we would have a "bigger voice" in the overall world market for frequencies. Mr. Wright's last paragraph is so true.

Ian Loughnan: I hope he progresses well at school and as he sounds very keen, he should gain the A.O.C.P.

—Ivor Morgan, VK3DH.
Licensed 1930.

(Continued on Page 21)

DX

Sub-Editor: DON GRANTLEY
P.O. Box 222, Penrith, N.S.W., 2750
(All times in GMT)

With good conditions looming to the fore during the month of November, we can look forward to some very pleasant hours over the holiday period. Despite the QRM, QRN and anything else you care to name, there is still a lot of good DX to be excavated from the depths of the 40 metre band, and not for the sole edification of the c.w. expert either. The higher bands are good, with some excellent openings on odd occasions on 10 metres. George VK3ASV/T, for example, reports a good opening on this band at 0300 to 0600 on 10th Nov. with a MUF of 38 MHz. to JA.

I was more than interested in VK3ASV's comments on the activity on 11 metres where the 27.125 net is occupied by many of our Amateurs including VKs 2AAV, 3AUJ, 3BBB, 3ASV, 3AVI, 3IO, 3AMA, 3SS, 3DY, 3WR, 3AWW, 3TO, 3ABC, 5IF, 7CX, 7JV and some ZLs. Mac Hilliard, one of our experienced S.w.l's and long time W.I.A. member operating from a Sydney suburb, using one of the better class of American receivers, reports heavy activity on this band, much of it coming from legal VK sources, but a load of purely unadultered garbage hailing from American citizen band operation on 27 MHz. really gives us an idea how this monster has got out of hand.

Two points of interest arise here. Firstly, there is a lot of illegal activity by Australian pirates adopting American tactics on this band, and it would be in the interests of the VK Amateur fraternity for these chaps to be put out of action. I am in the process of compiling a report for the appropriate department on this one. Secondly, as an interested spectator to the current Novice discussions, I feel that it would not hurt some of the parties concerned to have a good listen to the goings on from the West coast of W land in the citizen band (U.S.) segment of 27 MHz., then go up and have a look at the sedate and correct operation by the licensed Novices in their own bands. It may correct a few mistaken ideas.

But on to DX. Firstly a few contest results of interest to the VK gang. In the 34th B.E.R.U. held earlier this year the winner was VK6HD with 5,362 points, with VK3MR 2,965, VK2BPN 2,680, VK2NS 880 and VK2BJL on 17th, 20th, 53rd and 56th positions. "CQ" Nov. honor roll shows VK3AHQ with 308 points in 3rd position in the c.w. section, whilst he is in fourth place on the WPX honor roll with 809. To make a clean sweep, the same op. now has earned his WAZ on s.s.b.

Ernie Luff, our senior S.w.l. from VK5, has been on the sick list for the past few months, but still manages to keep the gear working, and has sent in a welcome list of QTHs which will be at the end of this column. I would take the opportunity of wishing Ernie a speedy return to health, he has been a faithful ally to me over the years in which I have been doing notes.

Activity from the Pacific area is quite plentiful and well spread over all bands. WB6IKI/KB6 has been on from that location, but is now active as VR1AC, where he is to stay for a year. QSL for his operations go to Box 1248, A.P.O., San Francisco, Calif., 96401. Helen KC6YL is on s.s.b. from the West Carolines usually around 14253 and has W3FDP for her manager. His QTH is W. Sedore, Box 950, Denton, Texas, 76201. I understand Helen and OM Bill KC6WS will return to the States shortly, in fact they probably have already. Bill is W3FDP, Helen is WA7SFA.

WB9IAO/KG6 returned to the States recently due to the death of his father, but should be back again by now under the calls of KB6DB and VR1AB. Manager is K3RLY. KG6SV, SI and SW are active from Mariana Is., the latter's manager is W7YBX.

Advance publicity was given re a proposed jaunt to Kure Is. by KH6GMP and group, however one of the helicopters crashed into the Kure lagoon and all flights to Kure from Midway have been cancelled, as was the operation.

XU1AA club station now has 13 Cambodian operators, including XU1VS who is fairly active. 40 metres is the main band for XU1AA, however they plan a tri-band beam in the near future. F.C.C. now permits W stations to work XU, and JA1KSO had planned to operate all bands from there during the "CQ" Contest. HS3DR also anticipated a visit over the first week in November. A late item says that the JA boys arrived there on Oct. 27 and stayed for a week. The QSLs should go to Box 484, Phnom-Penh, Khmer Republic.

Prefixes of interest, XX7IK and XX7FR were specials on the "CQ" Contest, QSL to I.R.E.M., Box 1234, Beira, Mozambique, and it will be used again in the last week of Nov. by CR7IK and CR7FR. Several 9J2 stations used the prefix 917 during the 7th anniversary of Independence celebrations. FY0GW and FY0KP were used recently, no reason given, but QSLs to DJ5SM and DJ5AY resp. KY6PMR was used in connection with the Space Fair from Pt. Mugu California, QSLs to WA6WWC. XX6FL active in early Oct. were from the Luanda International Fair, QSLs go to CR6LA. 1I4FGM QRV from Marconi Commemoration Foundation, QSLs to Box 2128, Bologna, Italy, and finally a group for the contest: 4C1QB from Mexico, manager W5QBM; 4M1A from Venezuela, manager W2GHK; 4N0DX from Yugoslavia, via YU1SJ, and 5J3CC from Colombia, to HK3CC.

From the elusive Zone 23, JT1AG is on 14 s.s.b. usually around 14200 to 220 at times ranging between 1300z and 1500z. His QSL address is Dambi Bou, Box 639, Ulan Bator, Mongolia. Anybody who has mailed a UA9VH/JT1 card to W3HNK and has not yet had a reply, please send Joe another card with QSL info, as a batch may have gone astray.

Andy MP4MBL has been in the British Commonwealth Net on 21354 at 1500z, and asks for QSLs to his home address, A. Matheson, Paradise Wood Cottage, Hartfield, Sussex. Steve G3FVC also operates the station while awaiting his MP4 call.

YJ8XX is Eric ZL1AJI and puts a fantastic signal in down here. His cards go to ZL1AMO. Other activity there from YJ8BL whose manager is W6NJU. YB9UA Casey is QRV from Waigeo Island, West Irian, OC34 for IOTA hunters, and QSL to Box 171, Djakarta, Indonesia.

To cater for the DX hunters of 40 and 80, UF6FE operates on 80 metres first Monday in each month on 3645 at 2359z, then QSYs to 7040 or 7070. DJ6QT had planned to do some operating on 40 and 80 during his TZ2AB trip which was completed on Nov. 10. QSLs to home address plus two IRCs.

Willy LX1BW is QRV week-ends on 3795 and 7085 s.s.b. Fridays and Saturdays, 2300 0800, using T4X L4B R4A. Maybe of little use to us here, however he states that LX1BW who is using c.w. is a phoney.

If you were lucky enough to work or in the case of the S.w.l. hear EP1JY/AM, this was King Hussein of Jordan flying home from the Iran 2500th anniversary celebrations.

AWARDS

Paris Award.—For contacts with stations in Paris, France, except mobiles. Class one for contacts with 20 districts, class two with fifteen, and class three with ten. QSL and 12 IRCs to F6AZN, Andre Noel, 31 rue Deparcieux 75-Paris 14, France. A silk scarf for YL is given with class one.

Capital Cities Award.—There are five of these available, to give full details would take a full page in itself, but to summarise, All Capitals Award is simple. Work any 20 world capital cities for the basic award since 1st Jan., 1968, and send GCR list and 7 IRCs to DL2HQ or DL9OT. The other four are issued from Sweden and claims should go to SM5BTX, Patrullgaten 6, S-723-47 Vasteras, Sweden, with 10 IRCs for each award. They are Worked European Capital Cities, Worked African Capital Cities, Worked American Capital Cities and Worked Asia Capital Cities. For each award you need to work 15 capitals in that particular zone, and if you want a full list of the capitals in each zone, drop me a stamped envelope. All five awards are available on heard basis to S.w.l's.

TRANS PACIFIC 160 MX TESTS

Briefly, the ones which will concern the VKs are Jan. 1, Jan. 15, Feb. 5 and Feb. 19. VE/W stations call CQ DX test during first five minutes from 1330 to 1335, and the DX calls during the even 5 minutes. Tests last until 1600z. VE/W will be on 1800/1810, JA are on 1907.5 to 1912.5, VK mainly 1802 to 1805 with ZL on 1876. Special sunset to sunset tests between VE/W/JA on same dates at 0700 to 1000z on the same dates.

SOME QTHs

HC1ARE—James, Club Station, Box 289, Quito Ecuador.
HC6JB—Joe, QSL to DJ9ZB.
KR8EA—Box 96, Okinawa.
YV7IC—Box 72, Porlamar, Isle de Margarita, Venezuela.
YV4AFG—Box 18, Morocai, Venezuela.
5W1AU—Box 1069, Apia, West Samoa.
4J0BJ—Box 88, Moscow.

We have to curtail any further notes here, due to space limits, however I am now again receiving Geoff Watts DX News Sheet every week, and as this contains everything of possible interest I will probably be able to answer any queries which anybody has.

My thanks this month to VK3ASV/T, Albert Cash, Mac Hilliard, Ernie Luff and the Geoff Watts DX News Sheet, also to VK3CIF. 73 de Don L2022.

Late DX news from VK2QL: For those needing Sao Thome on c.w., CR5AJ has received a number of additional xtals and is reported active daily on 14000, 14013, 14026, 14040, 14046, 14050, 14065 or 14100 kHz. He expects to be there for five years. CR5SP is keeping the s.s.b. boys content. He has been reported as getting into VK round 0630z.

Juan de Nova was activated by FR7AE/J for 36 hours on Nov. 12-13. There will be a change of operators shortly from the Kerguelen station FB3XX. They will be F6APG and F6BPS. F2MO will remain as QSL manager. If you still need Chad Republic keep a close look for TT8AD. He closes down from there on Dec. 15. C.w. activity from Gambia on 3503, 7003, 14030, 21030 and 28030 by ZD3Q until Dec. 8; QSL via OZ3PO.

CORRESPONDENCE

(Continued from Page 19)

Editor "A.R.," Dear Sir,

I have been following the correspondence in your columns about the Novice licence debate and wish to add my strong support to those Institute members and others who have sent letters in favour of this form of licence.

Owing to family and business pressures I have found it too difficult to continue with the A.O.C.P. course, but feel that I could manage to cope with a simpler form of training such as the Novice licence implies. I am quite willing to accept the fewer transmitting conditions that would be available to me in this situation and am certain that, over a period of Novice experience, I would be able to improve my knowledge and operating skill to the A.O.C.P. standard. Please record this letter as a pro-Novice vote.

—Leon A. Sheers.

Editor "A.R.," Dear Sir,

I am an administration officer, stationed in a rather remote out-station in Papua, and, following an interest picked up while in school, I applied for an Amateur Radio Operator's Licence, only to be confronted by an archaic system of classes and tests. Surely a Novice-type Amateur licence could be introduced that would suit people in my special situation, of which, I am sure, there are many.

My friends in Japan and the United States assure me that these simplified Novice licensees are in operation over there, and quite successfully too. Why can't these types of licences come into operation in Australia as well?

I am sure many of your readers will share my views.

—Peter R. J. Turner.

Editor "A.R.," Dear Sir,

At the last meeting of this group all members present signed a petition to the Federal authorities of the Institute requesting that the W.I.A. might seek from the Postmaster General a third level of Amateur transmitting licence, mentioned generally as a Novice licence.

In submitting this petition we have given special thought to the value of this form of transmitting concession as a means of aiding the instruction of people wishing to enter the Amateur Radio hobby and using Amateur-band communications as a means of communication in the public interest. Our group has had experience of the need for capable radio operators under emergency conditions, especially during the 1968 bushfires in this area and we are planning ahead so that more of our members will be able to operate, instal and maintain the radio equipment available to our fire-fighting unit.

Furthermore, we have noted with interest your Federal President's statement in Nov. issue of "A.R." in which he stated (page 2): "In my view the Amateur Service over the next few years could face a questioning of its position and perhaps its very existence . . . It is clear that the Amateur Service as a whole must be able to demonstrate the usefulness to which it puts its frequencies." We put forward the suggestion that a Novice licence used as an aid to instruction in radio communications could well help to back up your President's contention.

—C. J. Hoppitt,
Captain, Nth. Springwood V.B. Comm. Group.

OBITUARY

ADRIAN H. MILLER, VK3AH

Adrian Miller, VK3AH, passed away suddenly on Sunday, 14th November, aged 54 years.

First licensed in 1937, having attended the W.I.A. classes with Bob Cunningham as instructor, Adrian remained reasonably active on all bands and retained a very active interest in all Amateur matters.

Five years' service in R.A.A.F. radar found him a Flt.-Lt. in charge of radar stations.

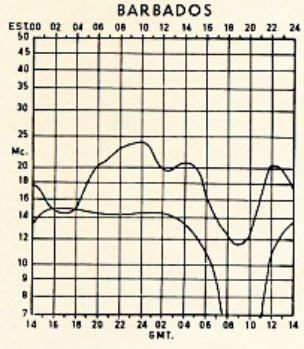
An accountant by profession, he was employed, from leaving school, by the Melbourne Herald-Sun organisation. He spent many years with 3DB and then when t.v. started, with HSV7.

Members of the W.I.A. extend their sympathy to his wife, teenage son and daughter.

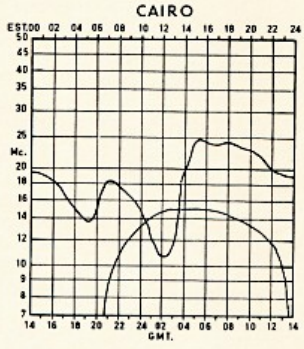
PREDICTION CHARTS FOR JANUARY 1972

(Prediction Charts by courtesy of Ionospheric Prediction Service)

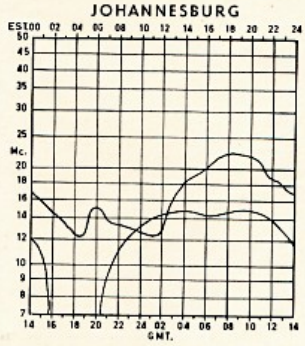
BARBADOS



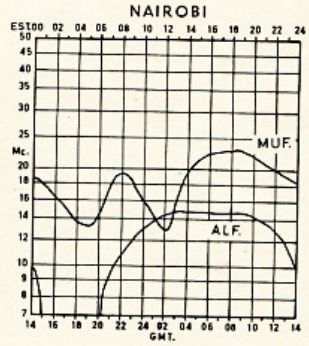
CAIRO



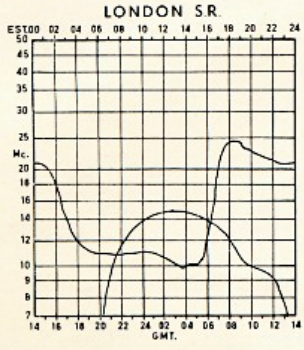
JOHANNESBURG



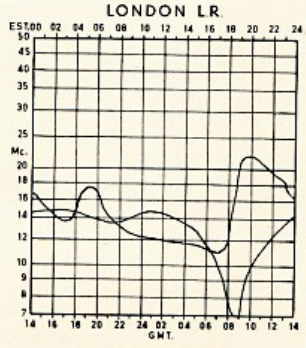
NAIROBI



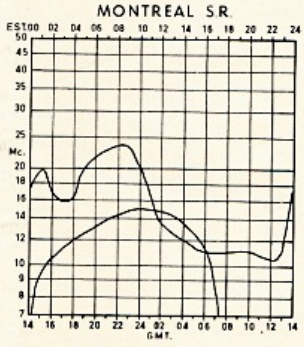
LONDON S.R.



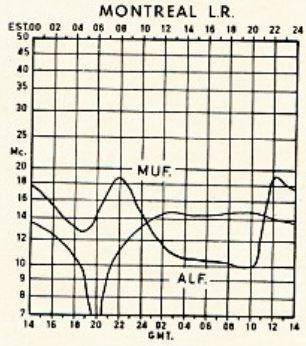
LONDON L.R.



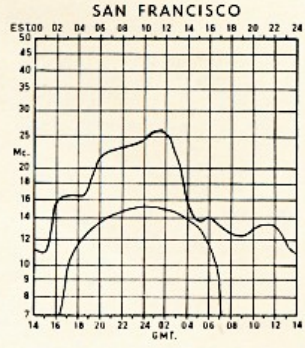
MONTREAL S.R.



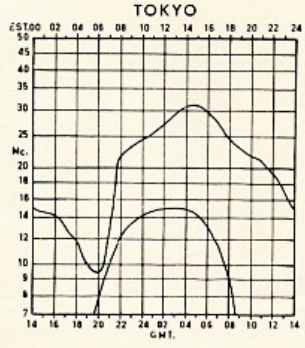
MONTREAL L.R.



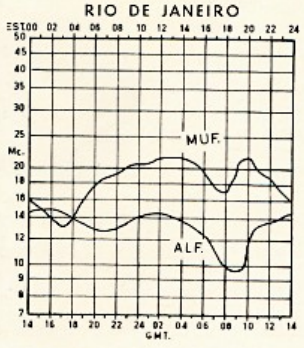
SAN FRANCISCO



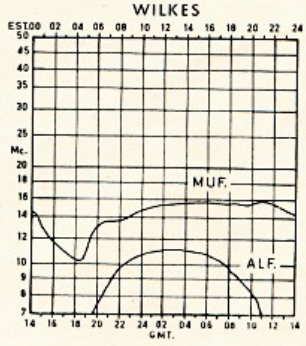
TOKYO



RIO DE JANEIRO



WILKES



VHF

Sub-Editor: ERIC JAMIESON, VK5LP
Forreston, South Australia, 5233.

Closing date for copy 30th of month.
Times: Eastern Summer (Daylight Saving) Time.

AMATEUR BAND BEACONS

VK0	52.525	VK0MX, Mawson.
	53.032	VK0TM, Macquarie Island.
	53.544	VK0PF, Casey.
VK2*	52.200	VK2II, Sydney.
VK3	144.700	VK3VE, Vermont.
VK4	52.400	VK4WI/2 Townsville.
	144.390	VK4VV, near Toowoomba.
VK5	53.000	VK5VF, Mt. Lofty.
	144.800	VK5VF, Mt. Lofty.
VK6	52.006	VK6VF, Bickley.
	52.900	VK6TS, Carnarvon.
	52.950	VK6VE, Mt. Barker.
	144.500	VK6VE, Mt. Barker.
	145.010	VK6VF, Bickley.
VK7	144.900	VK7VF, Devonport.
VK9	144.600	VK9XI, Christmas Island.
ZL1	145.100	ZL1VHF, Auckland.
ZL2	145.200	ZL2VHF, Wellington.
ZL3	145.300	ZL3VHF, Christchurch.
ZL4	145.400	ZL4VHF, Dunedin.
JA	51.995	JA1IGY, Japan.
W	50.091	WB6KAP, U.S.A.
HL	50.100	HL9WI, South Korea.
ZK	50.100	ZK1AA, Cook Island.
KH6	50.101	KH6EQI, Hawaii.
	50.015	KH6ERU, Hawaii.

* This station operates as a manned beacon, i.e. attended.

There have been two further additions to the beacon list this month, firstly, VK4WI/2 at Townsville on 52.400 and VK6VE at Mt. Barker near Albany on 52.950 MHz. It is anticipated both of these beacons will be in operation by the time these notes are read. Eddie VK1VP mentioned during a contact a few days ago that a beacon for Canberra is "technically advanced" for the 144 MHz. band. When further news of this one is available details will be included. No news has come to hand from the Darwin area where there have been consistent reports of an impending beacon. It also seems probable a beacon will be established in the Gippsland area shortly on 144.450 MHz. The Sydney "attended operation" beacon is available through the kind courtesy of Michael VK2II and will be operational at least during the DX season, further information on future operation should be forthcoming in due course; the times of operation are variable, but it is expected to be operating some week nights and at week-ends.

The above beacon list has been maintained at its present strength for some time. It is intended to prune off the less likely beacons from the monthly listing after the next equinoxial period (April 1972) as with the declining sunspot numbers the likelihood of reception of beacons from U.S.A., Hawaii, etc., will be very remote indeed. It is intended to produce, probably twice a year, a list which will include these plus a few others for interest, so you can keep your records up to date. The list will continue each month of the Australian and New Zealand beacons, Christmas Island and Japan. It would be appreciated if those charged with the responsibility for construction of any future beacons could give me advice of such construction so the necessary advice can be given through these columns. Any frequency changes or corrections should be promptly advised to me to keep this list in "A.R." correct. I am indebted to those who do keep me informed, and for the many favourable comments I receive during QSOs on the various bands, v.h.f. and h.f., regarding the listing of beacons. This regular listing seems to have provided something people have needed.

Bob VK6BE and Aub. VK6XY are seeing to it that the Albany area will be on the map this year. The 2 mx beacon VK6VE has from 1st Dec. been running 24 hours a day instead of the off season period of 0730 to 0030 daily. Considerable time has been spent in upgrading the 2 mx beacon and efforts made to have the 6 mx one on 52.950 going for the DX season. Both have expressed considerable interest in 432 MHz. and efforts are being made to obtain parts for the construction of equipment by them for use on that band. It seems possilbe that if some help can be given from VK3 and VK5 to meet the power bill for the beacon set-up at Albany, a 432 MHz. beacon could be considered feasible. But as a small group costs pro rata are high, and it seems those most to gain in VK3 and VK5 should be prepared to help in some way. Leigh VK6WA in Perth beams to VK3 and VK5 at 2230 on Tuesdays, Thursdays, Saturdays and Sundays on 144.010 using c.w. If any contact eventuates and conditions are suitable, s.s.b. is available. Leigh usually spends five minutes calling, after which he listens.

While on the subject of people calling, David ZL4PG will be operating portable from a point 5,000 feet a.s.l. 40 miles west of Dunedin on 52.005 every ZL Field Day and VK3 Field Days, running 100 watts of a.m. Additionally, at week-ends David will beam VK from his home with a 5 element yagi between 0900 and 1130, same frequency and transmitter. Also he has available 50 watts of s.s.b. 51.0 to 51.5 MHz., and 144.0 to 144.5 MHz. He runs 100w. of a.m. on 2 mx, as well as 30w. s.s.b. on 432 MHz. A guy worth keeping in mind, particularly as he represents that elusive fourth district.

From George VK3ASV comes some news of the activities of the Eastern Zone (Gippsland) V.h.f. Group, who have been very busy during the winter months upgrading their equipment, and using the Latrobe Valley repeater VK3WI/R3 to swap ideas. In addition, Channel B was quite active, at times Channel C had to take the overflow! More than 50 f.m. operators in that area at present. The "one-up" crossband experimental repeater with an input on 147.760 and output 432.200 near Moe has operated successfully from Latrobe Valley to Melbourne. The current zone s.s.b./a.m. calling frequency is 52.100 and appears to be increasing in popularity.

George also advises that during the DX season the Eastern Zone 2 mx beacon should be operating experimentally from the Latrobe Valley floor near Traralgon on 144.450 MHz. The call sign will probably be VK3BEZ, pending P.M.G. approval. Initial power 1 to 3w. and running 24 hours per day.

Bob VK3AOT sends along his usual interesting notes and the following is extracted therefrom: "Brian VK7ZBY advises that a Ch. 4 repeater, VK7WI/R2 is now operating from Mt. Barrow, a site 4,600 ft. a.s.l. with 70w. output. A 2 mx beacon is also being considered for Launceston. The Devonport beacon, VK7VF, is now operating with 1w. output, but is soon to be increased to 10w. when a solid state amplifier being constructed by Brian VK3ZSJ is completed.

"Thursday, 11th November, was a particularly good night for 2 mx and 12 Melbourne stations worked VK7EM with signals to S9. On 432 MHz. the same night signals from VK7EM were also S9, and created quite a lot of excitement, but unfortunately Winston was unable to listen on 432 and stations had to be content to work crossband. Alan VK2ZEO was also very strong in Melbourne.

"For the interest of many with 432 MHz. gear, Alan VK2ZEO at Deniliquin has now completed equipment for that band, and only awaits a calm day to climb his 100 ft. tower to connect the 432 MHz. antenna. Alan is about 400 miles from Adelaide. Anyone interested?

"Mike Farrell, VK2II, has advised that a VK2 V.h.f. Field Day will be held over Jan. 1, 2 and 3. The only other official field day is in VK3 on Sunday, 3rd. Groups in other States usually also go out over that week-end, so possibilities of contacts over considerable distance could be availble." Thank you, Bob.

Six metres DX got away to a good start this season. The latter part of Nov. saw some excellent openings over most of the Continent. VK5 certainly came in for its share, 26th Nov. being a particularly outstanding day, with the band still open at midnight. States worked were VKs 1, 2, 3, 4, 5, 6 and 7 with many excellent signals, S9 plus from 1w. tx, etc., over 600 to 1,000 miles! The VK2 boys were heard to be having a ball on the f.m. net of 52.525 MHz.

It was noted a further increase in the number of stations now using s.s.b. on 6 mx, and with very good signals. Quite a few operators were caught with the new technique (to them) of having to call on the other station's frequency because of transceive operation. Until this form of operation becomes widely used on v.h.f., operators using transceivers could include in their calling procedure that they are "operating transceive". The station at the other end will then know it is necessary to v.f.o. on to the station calling or vainly hope the s.s.b. fellow tunes!

DAYLIGHT SAVING

With the introduction of daylight saving to VK1, 2, 3, 4, 5 and 7 until 28th Dec., some effects will be noticed for v.h.f. operation. Contests generally will be conducted on Eastern Standard Summer Time (or GMT) so that a contest commencing previously at say 0700 will still continue to start at that time, 0700 being in summer time. Some advantages do come out of this, in effect, as far as propagation is concerned, this is dependent quite largely on temperature changes. Therefore, those in the Eastern States and VK5 have the benefit of an extra hour for 2 mx operation in the morning before signals will deteriorate, i.e. 0700 is really 0600 propagation time! Similarly in the afternoon for sporadic E contacts, everyone should be home an hour earlier (propagation time) and signals which often decline or disappear with the approach of sunset will be there that much longer for you to enjoy. Eastern States should remember there is now a 3-hour time difference with VK6, and 1½ hours with VK8.

I note with interest from the pages of "The Victorian VHF-er" that someone even goes mobile on 576 MHz. Kevin VK3ZYP was heard operating mobile between Melbourne and Geelong. His tx produced 7w. output when fed into a turnstile antenna mounted on a ski-bar. A FET converter and valve tuneable i.f. were used on receive.

From the same source comes advice that Wally VK6ZAA has been appointed Director of Technical Education in Tasmania and will move to Hobart in Jan. 1972. Wally has s.s.b. gear on 6 and 2 mx and a.m. on 432. He has also been active on 576 MHz. (VK7 gain from VK6 loss.)

COMING EVENTS

1st, 2nd and 3rd Jan.—VK2 V.h.f Field Days.
3rd Jan.—VK3 V.h.f. Field Day.
23rd Jan.—End of Ross Hull Memorial V.h.f.-U.h.f. Contest.
12th and 13th Feb.—John Moyle Memorial National Field Day Contest.

To conclude, several bits of information have come to my notice: Dick VK2BDN has been doing some work on 3300 MHz. North Western V.h.f. Group has been formed in VK2 (up Tamworth way), and Chuck VK2DK is believed to be the Secretary. VK4ZTK, running 7 watts, reported to have worked a total of more than 200 JAs. The Devonport beacon VK7VF is using 16 stacked halos for an omni-directional gain of 9 dB.

That's all for this month. Something for you to think about: "Man is slow, sloppy and brilliant thinker; the machine is fast, accurate and stupid." 73, Eric VK5LP, The Voice in the Hills.

[Flash from Roger VK2ZTB: The Mawson beacon VK0MX was heard in Sydney on Thursday/Friday, 25th/26th November.—Ed.]

DIVISIONAL NOTES

NEW SOUTH WALES

VK2 QSL BUREAU

Inwards: Despatched by the Hunter Branch to members. Each member should advise the Hunter Branch what they require to be done with their cards. Address: P.O. Box 134, Charlestown, N.S.W., 2290.

Outwards: Leave at 14 Atchison Street, Crows Nest, or send direct (with money to cover enclosed cards) to: Mr. T. Lackenby, P.O. Box 96, Frenchs Forest, N.S.W., 2086.

An information sheet outlining the operation of the QSL Bureau is available from 14 Atchi-Street, Crows Nest, 2065. If a copy is required please enclose a stamped addressed envelope.

A list of publications and other Institute services may be obtained from the office. If enquiring by mail please send a s.a.s.e. for list.

Phone enquiries will not be accepted as there has been too much confusion with these orders in the past.

The Divisional office at 14 Atchison Street, Crows Nest, will be closed from Friday, 25th December, 1971, to Friday, 21st January, 1972, inclusive. All enquiries by mail will be dealt with as usual.

By the time these notes appear, the Divisional station VK2WI at Dural should be on the air with the Sunday morning broadcast. Frequencies available will be a.m. on 40 and 80 metres. On v.h.f. 52.525 f.m., 53.866 a.m., 145.13 a.m. and Channel 4 145.9 f.m. Later, transmissions will be added on 160 metres a.m. and 432 f.m. In addition s.s.b. facilities will be available on h.f. A trial broadcast was conducted on 28/11/71, but there were still a few gremlins in the new h.f. transmitters.

Members submitting information for "A.R." are reminded to have their information relevant to the month of issue.

Clubs are requested to advise the Secretary of their meeting dates, field days, etc., for the next six months so that we can include this information in "A.R."

Trading post items are being accepted by this Division for submission to the publishers of "A.R." Please refer to a statement, elsewhere in this issue, relating to Hamads.

Members are reminded that the Annual general meeting will be held on 24th March, 1972. A new Council is to be elected at this meeting and the closing date for nominations is 3rd March, 1972—in writing, with the Secretary at 14 Atchison St., Crows Nest.

Further details and the layout of nomination forms will be included in Feb. "A.R."

CLUB NET

A hook-up is held between officials of clubs and the Division on 7110 kHz. at 1000 EST every first and third Sunday of the month. This is to enable the exchange of information rather than a ragchew.

The frequency for the Divisional call-backs has been changed from 7050 kHz. (now a national calling frequency) to 7146 kHz. For the moment pre-broadcast calls will be made on 7050 kHz.

CLUB NEWS

The Canberra Radio Society held its annual general meeting on 19th Nov., 1971, and the following persons were elected: Reg VK1MP, President; Andrew VK1DA, Secretary; John VK1JL, Vice-President; and Gary VK1ZHG, Treasurer; Committee: Graeme VK1CG, Wal VK1ZWP, Ross VK1AW, Morrie VK1MF, Eugene VK1GT, Paul VK1ZPB, Eric VK1EP, Ron VK1ZRH and Eddie VK1VP.

VICTORIA

NATIONAL PARKS

This month many of us are on holidays and will be travelling in this State. The National Parks are very interesting places to visit and you can gain an award for contacts made either to or from a National Park.

The Victorian National Parks award is divided into two sections. Stations may claim an award for working from a minimum of 15 of the State's 23 National Parks. There is also an award for working stations operating from National Parks.

National Parks are located in all parts of the State and usually preserve some local scenery and the local flora and fauna. The locations of most parks are marked on the maps available from the major mapmakers. Most parks have good access roads and have a picnic area. A ranger is usually in attendance to assist you to find your way around and see the park's attractions.—VK3AUI.

EASTERN ZONE

The Eastern Zone held their second Zone general meeting since their annual convention last May, at Traralgon on 30th Oct. Peter VK3AUO, representing the lower class licensing proposal sub-committee (Novice licensing) gave the recommendations and proposals for the Federal Executive Novice Committee's meeting the following day in Sydney. The next Eastern Zone Convention to be held early in March, possibly at Moondarra or Licola. An activities group was formed to organise future field days, scrambles, film nights, a supper dance and possibly a regular zone annual dinner. The co-ordinator of this group will be Norm VK3YBD. The zone will participate in the National Field Day using h.f. and v.h.f. on Mt. Hoogley if the weather is favourable. David VK3SS outlined the zone h.f. DX "Wildcat Award" and it will now be also available for v.h.f. operators outside the zone. For further information write to the Zone Secretary, VK3ZNC, P.O. Box 175, Maffra, 3860, or any zone v.h.f. operator.

The Secretary reported that the insurance has been approved and that the Latrobe Valley Translator Club will move the L.V. Repeater VK3WI/R3 to Mt. Tassie. Brian VK3BBB was appointed as W.I.A. components officer and the sale of these will be made available at zone meetings and conventions, the A.O.L.C.P. classes and at the Latrobe Valley Electronics Club (Traralgon). The Zone will set up an Education Fund to promote Amateur Radio in Gippsland, assisting with future classes. At the moment classes are being run at Warragul (VK3UG), Traralgon (VK3BBB and VK3YEV), and Sale (VK3AXM and VK3KR). Visiting Chilian Amateur, Pedro CE6DR, who was staying at Dumbalk, now has moved to Mirboo North. —VK3ASV.

SOUTH AUSTRALIA

The swap and shop afternoon on Sunday, 14th Nov. organised by Marshall VK5QO and his willing helpers VK5NN, VK5XV, and VK-5NB, was a great success with another undoubtedly on the way. The rather cool November weather allowed the drinks and ice cream at the v.h.f. group picnic on 21st Nov. to last all day, so assisting to make the day a success.

A special meeting of the V.h.f. Group decided that in view of the clash of frequencies of the Australis satellite with 145.9 MHz. of Channel 4 repeaters, and that the whole allocation of repeater frequencies below 146 MHz. could cause similar difficulties with spaceborn packages limited to the world-wide allocation of 146 MHz. down, recommend changing repeater frequencies to a separation of 600 MHz., but retaining existing mobile transmit frequencies of 146.1 to 146.4 MHz. and changing receive frequencies to 146.7 to 147.0 MHz. The V.h.f. Group feels that the cost of this at this time will be small compared to future costs and that satellite work is the greatest public relations aspect Amateur Radio has ever had. The V.h.f. Group invites comment.

The November Divisional meeting heard a most interesting lecture from Al Smythe, VK5MF, on slow-scan t.v. From the enthusiasm generated, there may well be many strange signals on 14 MHz. quite soon. The January meeting is the delayed lecture by John VK8AV on teletypes and r.t.t.y. The February meeting is the A.G.M.

The V.h.f. Group January meeting will probably be a barbecue on the Saturday afternoon and evening, the 8th. The Feb. meeting is the A.G.M. —Bart VK5GZ.

CALENDAR

EVENTS AND CONTESTS

2 Jan.—VK2: V.h.f. Field Day; 12-hour period, rules as per Ross Hull distance scoring table.

3 Jan.—VK3: V.h.f. Field Day.

8 Jan.—VK5: V.h.f. Barbecue.

12 Jan.—VK2: St. George Am. Rad. Society.

12/13 Jan.—ZL: V.h.f. Field Day.

23 Jan.—23.59 hours E.A.S.T.—end of Ross Hull Memorial V.h.f./U.h.f. Contest, 1971/72.

25 Jan.—VK5 and VK6 General Meetings.

28 Jan.—VK2 Divisional General Meeting.

29/30 Jan.—"CQ" W.W. 160 mx CW Contest, and French CW Contest.

3 Feb.—VK5 V.h.f. A.G.M.

4 Feb.—VK2: V.h.f. Group meeting; Gosford; Newcastle.

5/6 Feb.—A.R.R.L. Phone DX Contest.

9 Feb.—VK5 St. George Am. Rad. Society.

12/13 Feb.—National Field Day Contest, 1972 (refer Nov. "A.R." p. 13), also ZL V.h.f. Field Day.

"A.R." HAMADS

The following re-organisation relating to "Hamads" in "Amateur Radio" has been agreed to by the Victorian Division and also on behalf of Federal Executive. This agreement, naturally, is based on the present scope and format of the column in "A.R." and may require revision in the light of further experience.

With effect from the February issue of "A.R." "Hamads" will be printed free of charge for members of the Institute provided certain limitations and conditions are met. The maximum space allowance for a free insertion will be four printed lines. Four lines of print are taken to contain not more than 200 characters/spaces, which is equivalent approximately to 33 words of five letters each separated by one space. This free allowance will be **inclusive** of name and address but will exclude the nature of the requirement (e.g. "For Sale", "Wanted") and the first word in the Hamad specifying the place where the goods or services are located or are needed (this first word is the name of the city or town). In order to save words, the expression "QTHR" may be used to mean that the advertiser's name and address are correct in the current Australian Call Book. Thus a "Hamad" might conclude as follows: "VK7ZZZ QTHR Ph. 123456".

The telephone number obviously would be the home QTH and the city (town or suburb) would be as listed by the first word of the "Hamad".

If any "Hamad" exceeds the maximum free allowance, it will be charged at $6 per column inch and no free allowance can be claimed. The minimum charge will be $6 and each additional column inch or part thereof will cost $6. To achieve publication the charges must be prepaid. A column inch is deemed to be 12 lines each of approximately 50 characters/spaces.

Hamads is a service restricted to members of the Institute unless prior arrangements are made with the Editor if exceptional reasons exist, e.g. deceased's effects. Repeats of Hamads will carry the full rate of $6 per column inch irrespective of whether or not the initial insertion was free of charge. If publication is required in any particular month, the copy should reach the Editor on or before the third day of the preceding month. Payments will not be acknowledged unless specially requested and no correspondence can be entered into concerning Hamads.

It is regretted that it is not possible to comply with any instructions requesting bold face type or any non-standard display or typographical arrangement. It is also regretted that no responsibility can be accepted either in respect of any errors or omissions or concerning any goods or services on offer and no guarantee can be given that any material as submitted will be published at all or in any particular issue although, naturally, every effort will be made to meet the wishes of advertisers.

Each Hamad should preferably be in typescript, double-spaced on one side of the paper and must be signed by the member—together with a reference to his membership number. The Editor reserves his right to edit all material, including Hamads, submitted for publication in "Amateur Radio" but quite obviously these powers are very seldom required in respect of Hamads.

Any Hamad which is deemed to be of a commercial nature will be subject to rejection even if submitted by a member and no Hamads by or on behalf of clubs or organisations will be accepted except by prior agreement with the Editor. It is to be observed that any Hamad rejected on these grounds or for other reasons may, subject to the Editor's decision in relation to suitability, be accepted for publication in "Amateur Radio" as a normal "commercial" advertisement.

—P. B. Dodd, Federal Manager.

INTRUDER WATCH REPORT

Because of Intruder Watch vigilance the spurious transmission on 14240 kHz. from the B.B.C. relay at Johore in Malaysia has been cured, and is no longer heard. Your Federal Co-ordinator is keeping in close liaison with the Radio Branch, so keep those reports coming in.

The following is an extract from a letter received from a VK8, I quote:—

> "There is a ruffian on c.w. on the 14 MHz. band. He is very strong day and night time. His tx was very ruff . . . about 50 kHz. wide. I think he was keying the mains!!! Managed to QRM him down below 14000 at one stage, but he came back up again. At one time he got really hostile, abused me and TOLD ME TO GET OFF THE BAND!!! I just kept on calling 'CQ' as if nothing happened. Also had a ring from the RI re key clix reported by a VK4 Amateur who blamed me for his key clix."

Further ideas reference this matter appear in a "Letter to the Editor" in this issue.

—Alf VK3LC, Intruder Watch Co-ord., W.I.A.

SILENT KEY

It is with deep regret that we record the passing of—

VK3AH—A. H. Miller

COOK BI-CENTENARY AWARD

The following additional stations have qualified for the Award:

Cert. No.	Call	Cert. No.	Call	Cert. No.	Call
1414	AX6MA	1422	AX1AN	1430	AX2BD
1415	DK2PS	1423	I1TQ	1431	W7GXL
1416	ZS6GH	1424	I1IR	1432	AX4LV
1417	I1PML	1425	AX3VK	1433	AX5OH
1418	YB1BM	1426	HB9MO	1434	VE3ON
1419	SM2DR	1427	XW8CN	1435	VE3EWY
1420	EA1IM	1428	W2NR	1436	AX5AV
1421	G3IGX	1429	ZM1AFA	1437	K9LKA

V.H.F./U.H.F. SECTION

Cert. No.	Call
29	AX4ZFB
30	AX4ZTL

— . . . —

KEY SECTION

The Key Section is now seeking members. The full rules were published in November "A.R.," but in brief: 50 c.w. contacts lasting at least 15 minutes, which must include 25 contacts with other VK stations, are required. Write to Federal Manager, Key Section, P.O. Box 67, East Melbourne, Vic., 3002.

If you troubled to read the rules of the 1971-72 Ross Hull Contest in October "A.R." you will have noticed that a c.w. section is provided. This was re-instated at the request of the Key Section; it had been deleted through lack of support. The majority of c.w. operators are not interested in v.h.f. operating, but there are sound reasons for expecting c.w. to give advantages over other modes on these bands as well as on h.f. If you have v.h.f. gear, why not dust it down, install a key socket, and give the contest a bit of support.

There is a postal vote out to Divisions to provide a multiplier for c.w. contacts in the R.D. Contest. I have not heard the result yet. There was not enough time to alter the rules of the 1972 N.F.D. to provide a similar incentive for c.w. operation; this should be fixed for the 1973 N.F.D. however.

I am overseas until the end of March, so there will be a lack of topical items for a couple of months in this column. The processing of membership applications will go on, though, so do not let me stop you applying! 73, Deane VK3TX.

— . . . —

RECIPROCAL LICENSING—SWEDEN

The "Worldradio" issue of 25th October contains details of the rules applicable to foreign nationals in or visiting Sweden. An application form, as printed, is required to be submitted through certain channels to the Central Administration of Swedish Telecommunications, Radio Development Section, to reach them at least TWO months before the licence is required. Other requirements include a certificate of good conduct. No fee is payable for periods up to 30 days, after that the fee is a quarter of the regular annual fee (of 40 SW Kroner) for each three-month period.

— . . . —

SUNSPOT NUMBERS

By courtesy of the Swiss Fed. Observatory, Zurich, the smoothed monthly predictions: Jan. 37, Feb. 45, Mar. 43, Apr. 42. Smoothed mean for April 1971 68.0. Provisional numbers for Oct. 1971 ranged from 17 on the 15th to 87 on the 25th.

CHANGE OF ADDRESS

Ionospheric Prediction Service is now at:

162-166 Goulburn St., Darlinghurst, N.S.W., 2010

See letter Dec. "A.R.," page 15

HAMADS

Minimum $1 for forty words
Extra words, 3 cents each

HAMADS WILL NOT BE PUBLISHED UNLESS ACCOMPANIED BY REMITTANCE

Advertisements under this heading will be accepted only from Amateurs and S.w.l's. The Publishers reserve the right to reject any advertising which, in their opinion, is of a commercial nature. Copy must be received at **P.O. 36, East Melbourne, Vic., 3002,** by **3rd of the month** and **remittance must accompany** the advertisement.

FOR SALE: FT-DX-400, new, never used, $450 O.N.O. VK2ZYH, DC0ND, 38 Engadine Ave., Engadine, N.S.W., 2233. Phone 520-0325 after hours, week-ends.

FOR SALE: Heathkit HW32A Transceiver, complete with power supply/speaker unit, manual, and pair spare final tubes. Excellent working order, $120. VK4UC, 104 Camp St., Toowong, Qld., 4066. Phone 71-1309.

FOR SALE: Trio TR-2E 144 MHz. Transceiver. 24w. input to 6360 final. Full 144-148 MHz. coverage. Separate Tx and Rx VFOs. In-built 230v. a.c. and 12v. d.c. supplies. As new, very little used, still in original carton, with mic, a.c. and d.c. leads, and instruction book. $160 or suitable offer. J. Brown-Sarre, VK2ZVJ, Buronga, N.S.W.

FOR SALE: Yaesu Transceiver FT50 with FV50C VFO. Excellent condition, $190. R. Chalmers, VK3ARO, 6 Gatehouse St., Parkville, Vic., 3052. Phone 347-3826.

FOR SALE: 6 metre equipment: VK3 Converter, working, less crystal. X1760 Jindivik v.h.f. 10 watt a.m. transmitter, converted, working, less crystal and power supply. Five element yagi. The lot $38. R. Clarke, VK3BCL, 23 Glen Drive, Eaglemont, Vic. Phone 49-4246 (evenings).

RECEIVER, Star SR-500 double conversion. Ham bands 160 to 6 metres, SSB/AM/CW. Has 55 kHz. 2nd i.f. with selectivity switchable from 4 kHz. to 500 Hz. at 6 dB. down, $120. Mosley TA-33Jr 3 element tri-band yagi, lightweight beam, $60. C. Bicknell, VK3BCF, 13 Roland Ave., Strathmore, 3041. Phone (03) 379-2623.

SIX METRE equipment for sale: (1) FM MR6 Base Station, excellent condition with crystals for 52.525 MHz., modified and operating, suit table-top, going for $45. (2) Mobile FM MR10C, block filter in the receiver, modified and crystaled for 52.525 MHz., in good condition, also going for $25. Contact more information Phil Bowers, VK2YS, on 069-214343 or write to P.O. Box 551, Wagga, N.S.W., 2650.

WANTED: Band-change motors and L-R indicator drive transformers to suit 24 volt Bendix MN26 Radio Compass sets. Transformers are marked T16 or A15064. State price required. Also Vintage Radios complete with Horn Speaker, early 1920's, good price paid, send details. O'Brien, Edgar Rd., San Remo, Vic., 3925. Phone 107.

WANTED: Crystal Calibrator covering up to 250 MHz. on fundamentals with 1 MHz. spots or similar t.v. calibrator. State specification and price to P.O. Box 57, Raymond Terrace, N.S.W., 2324.

WANTED: Johnson Matchbox. P. G. Broughton, 211 George Street, Sydney, N.S.W., 2000.

WANTED: Just starting out. I'm after a 2 metre transceiver, mobile or fixed, a.m. or f.m. 6 metre transceiver, mobile or fixed, 6 metre converter. Ring H.M.A.S. Anzac during working hours (8.30-3.30) or Tony Smith, 151/3 Slattery Place, Eastlakes, N.S.W. Phone 663-7336.

WANTED: Linear Amplifier, used. Suitable to be converted to 6 mx. Full 400w. p.e.p. output with p.s.u. included. Contact P. Jackson, VK6ZDY, 60 Anzac Terrace, Bassendean, W.A., 6054.

WANTED: Rotary Converter to restore R.A.N. Type S Synchronous Rotary Gap Spark Transmitter. Output 70 v.a.c. at high frequency, probably 500 Hz. Unit will probably have 24 field poles and can be identified by an extension shaft coming out one end for driving rotary gap. R. F. Fisher, VK3BAQ, 241 Royal Pde., Parkville, Vic., 3052. Phone 340-5931 (business hours).

WANTED: Yaesu FTdx400 Transceiver; other items required include Table Microphone, "Autronic" Key and Keyer, and S.W.R. meter. Details to VK4SO, Mervyn Eunson, Box 1513, G.P.O., Brisbane, 4001. Telephone (business) 2-2831.